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# AVALIAÇÃO DO IMPACTO DA CORRUPÇÃO RELATIVO AO COMÉRCIO DOS PAÍSES EXPORTADORES DE PETRÓLEO

# ASSESSMENT OF THE IMPACT OF CORRUPTION ON TRADE IN OIL EXPORTING COUNTRIES

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# ASSESSMENT OF THE IMPACT OF CORRUPTION ON EXPORTING COUNTRIES

Dissertação apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Economia, realizada sob a orientação científica da Professor Doutor João Paulo Cerdeira Bento, Professor Auxiliar do Departamento de Economia, Gestão, Engenharia Industrial e Turismo da Universidade de Aveiro e da Professor Doutora Violeta Pukeliene, Professora da Faculty of Economics and Management de Vytautas Magnus University, Kaunas.

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Aos meus pais Zarif Kabirovich e Svetlana Tohtarovna. À minha primeira universidade na Kazakhstan, a Academia de Ciências Sociais e do trabalho, que me deu o conhecimento principal em economia. À Universidade de Vytautas Magnus, que me deixou frequentar o curso de Mestrado e depois estudar na Universidade de Aveiro. À Universidade de Aveiro e todos os professores pela possibilidade de obter o "Dual Degree". Uma gratidão especial aos Professores João Paulo Cerdeira Bento da Universidade de Aveiro e Jonė Kalendienė da Universidade de Vytautas Magnus.

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**palavras-chave**

Corruption, International Trade, Oil exporters, Augmented Gravity Model, PPML, OLS.

**resumo**

O objectivo desta investigação é compreender o impacto da corrupção no comércio dos países exportadores de petróleo. Consideramos as possibilidades e os resultados da corrupção e o efeito da corrupção no comércio. Utilizando um conjunto de dados de painel para 10 países no período 2000-2018, este estudo contribui para a área de comércio e corrupção nos países exportadores de petróleo. A primeira parte deste estudo expõe as causas da corrupção e apresenta uma revisão literária de muitos autores sobre corrupção e comércio em países exportadores de petróleo. A segunda parte analisa os métodos e expõe a construção de um modelo econométrico para a estimativa do impacto da corrupção. Utilizando um conjunto de dados de painel para 10 países no período 2000-2018, este estudo contribui para a área de comércio e corrupção nos países exportadores de petróleo. E a última parte apresenta os resultados dos dados de pesquisa e avaliação apresentados na terceira parte expor, que uma diminuição na corrupção no país exportador melhora o comércio e, do lado dos importadores, uma diminuição na corrupção induzirá um aumento no volume do comércio.

**keywords**

Corruption, International Trade, Oil exporters, Augmented Gravity Model, PPML, OLS.

**abstract**

The aim of this research is to understand the impact of corruption on trade in oil exporting countries. We consider the possibilities and outcomes of corruption and the effect of corruption on trade. Using a panel data set for 10 countries over the period 2000-2018, this study contributes to the area of trade and corruption in oil exporting countries. The first part of this study exposes the causes of corruption and presents a literature review of many authors concerning corruption and trade in oil exporting countries. The second part reviews the methods and exposes the construct of an econometric model for the estimation of the impact of corruption. Using a panel data set for 10 countries over the period 2000-2018, this study contributes to the area of trade and corruption in oil exporting countries. And the last part presents the results of the research and assessment data results presented in the third part expose, that a decrease in corruption in the exporting country improves trade and on the importer side, a decrease in corruption will induce an increase in trade volume.

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# INTRODUCTION

## Background

Different levels of corruption we can find in every country. The increasing scale of corruption, in many countries of the world, and the increasing degree of its negative impact on trade need a new assessment of this phenomenon in modern conditions. Corruption is the misuse of one's power for private gain. Corruption classified as grand, petty and political, depending on the amounts of money lost and the sector where it occurs. The main issue of combating corruption is one of the infinite issues of the organization of the state. Specific measures that can reduce corruption in the state and society and identify and punish those involved in corruption play an important role in the fight against corruption. (Transparency International)

In research, perception of corruption has progressed gradually from illegal activity that characterizes the beginning of emerging nations to common modes of government that overlap with institutional processes. Corruption will manifest as bribing, embezzlement, clientelism, bribery, patrimonialism, dependent on a series of social relationships (Granovetter, 2007; Rothstein and Varraich, 2017). However, the way corruption looks mostly depends on the specific conditions in which it appears. As seen by the Petrobras cases in Brazil in 2014, JPMorgan Chase in Nigeria in 2011, or 'Kazakhgate' in Kazakhstan in 2003, oil-related corruption quickly became a major scandal affecting the highest political ranks. After this case the oil sector attracted even more attention, which led to the development of researchers in field of corruption in oil exporting countries.

**Relevance and topicality.** Among the global problems of our time that determine the future state of the economy, there is also a problem with corruption. Corruption is one of the challenges of global development. Corruption weakens the rule of law and democracy, which leads to human rights violations, impairs mechanisms that have been honed, violates human rights, and contributes to the development of crime, terrorism, and other threats to international security.

Nowadays, corruption has spread in many countries. Special departments are created to combat them. Corruption exists in all structures, but it can cause particular harm to the economy. In this master thesis will be studied the existence of corruption in oil-exporting

countries. Oil exports are the important and main branch of development of economy in oil exporting countries, and trade as the main interaction with other countries can be subject to corruption since it is in oil area money has a large turnover.

**Research problems:** How does corruption affect international trade in oil exporting countries?
What is the role of "institutional quality" in this relationship?

**The object** of the final master thesis is the impact of corruption on trade.

**The aim** of the thesis is after the analysis of the theory of corruption and trade to create econometrics model of the assessment and to evaluate the impact of corruption on trade in oil exporting countries.

To reach the aim of the paper the following **objectives** were set:

1. To summarize the theory and research on trade and corruption and make literature review of authors that includes research topic of the impact of corruption on trade.
2. To select a list of countries that are oil exporting countries and have a high level of corruption for the econometrics calculation, Estimating the gravity coefficients on a list of oil exporting countries and years utilizing different corruption steps.
3. To analyze the data of trade, corruption and the importance of combating against corruption using data from the most concerning database, such as, World Competitiveness Report, World Bank's World Development Indicators, Eurostat, World Bank. OECD, CPI and Transparency International.
4. To create and examinethe data using an econometrics model of panel data to estimate the effect of corruption on the trade in oil exporting countries, and in this research will be used data methods of a random effect, common effect, fixed effect, Ordinary Least Squares estimator (OLS), and Poisson Pseudo Maximum Likelihood estimator (PPML).

The paper is **structured** in 3 main parts.

**The first part.** Important aspects of this study in Part One of this final master thesis are summarized research issues, questions, including the study's importance, key motivations, and literature review.

**The second part.** Framework for thesis assessment is composed. Great attention will be paid to the Panel Model and the Gravity Model of International Trade as it is the main empirical model that will be used in this dissertation to analyses trade.

**In the third part** the results of the assessment are analyzed and discussed, and the importance and impact of corruption on trade in oil exporting countries is summarized.

**Research methods.** Data from the most concerning database, such as, World Competitiveness Report, World Bank's World Development Indicators, Eurostat, World Bank, OECD, and tradingeconomics.com are used. This research examines the theoretical part and collect empirical data using econometrics model of panel data to estimate the effect of corruption on the trade in oil exporting countries. The use of panel data, the analytical tools used in this research will be random, common effect, fixed effect, Ordinary Least Squares(OLS) estimator, and Poisson Pseudo Maximum Likelihood (PPML). For the econometrics estimation of international trade and corruption will be used the gravity model by using data about the level of corruption and the volume of exporting oil from the countries.

**Information sources.** OECD, World Bank, Eurostat, World Competitiveness, tradingeconomics.com, Organization of the Petroleum Exporting Countries, Corruption Perception Index, Global Economic Data, Indicators, Charts& Forecasts.

# I. LITERATURE REVIEW

This chapter covers the theoretical part of the impact of corruption on trade in oil-exporting countries. Opinions and views of authors who publish their vision on this topic will be considered. In the first part, we will look at the theory of corruption, which will cover the topic of corruption in oil exporting countries, as well as the impact of corruption on trade. In the second part, you will see a review of the literature of many authors who cover the topic of trade. And the last part summarizes the research of the impact of corruption on trade analysis.

## 1.1. Theories of corruption and its evaluation

Corruption raises the degree of uncertainty and the likelihood of violence by undermining the authority and prestige of state agencies, and compromising attempts to establish peace and preserve peace. Parallel to that, corruption generates dynamics of wrongdoing which may not have occurred previously. The studies below aim at different aspects of the effect of corruption on oil exporting countries.

Corruption erodes trust in government and undermines the social contract. Corruption impedes investment, with consequent effects on growth and jobs. Countries capable of confronting corruption use their human and financial resources more efficiently, attract more investment, and grow more rapidly (World Bank, 2018).

Corruption in oil industry regulation is often referred to as prevalent variations in the extent to which the oil industry benefits host countries. Improved access to information, active journalism, and watchdog non-governmental organizations all encouraged international comparisons. Many countries, like Norway, are praised for their strong oil wealth management. Despite the development in the oil industry (GDP per capita in Nigeria concerning Purchasing power parity (PPS)), other sectors, such as Nigeria and Angola, were experiencing a negative economic increase at the same level as in 1970.

"Resource curse theories" are important to understand the structural problems faced by oil-rich nations, and corruption is a significant cause for the "carbon curse" theory. Nevertheless,

our knowledge of how corruption currently affects major decisions in the petroleum industry is limited and policymakers have only outdated information on the main risk fields. This section provides a fundamental survey of the study of how and why corruption can misrepresent or prevent effective oil sector regulation. The emphasis is primarily on the roles played by host governments, private petroleum companies, and donor governments, but the position of state-owned national petroleum companies (NOCs) and others is also increasingly dominant. We begin a debate on emerging petroleum patterns of corruption significance and then examine the risks of corruption in the regulatory process. The early literature on resort-rich socioeconomic development attributed its misleading economic success to a 'curse' in which the assumption was that countries with an abundance of natural resources simply cannot develop as quickly as countries lacking such resources (Sachs and Warner, 1994). The curse 's original understanding was based on a pure economic basis, which argued that massive losses of wealth contributed, amongst other diseases, to the Dutch epidemic, general macroeconomic chaos, and debt overhang (Corden, 1984). The following literature notes that oil wealth decreases growth, because it may cause corruption and profits — a voracious effect that affects long-term growth (Tornell and Lane, 1999). This may have a negative impact. During the boom in the resource sector, the connection between oil and corruption is becoming clearer, which is starting to turn capital into less profitable and rent-generating activities such as white elephants, which are negative social surplus investment projects (Robinson and Torvik (2005), Collier and Goderis (2007)).

The resource phenomenon study – which shows how petroleum revenues can make governments deviate from social welfare policies – tends to be negatively affected by very low growth, low human development, and high levels of poverty and inequality (Ross (1999), Sachs & Warner (1995), Bulte et al. (2005)). The resource curse is described by a variety of problems including Netherlands diseases, rent demand, sponsorship, and institutional degradation. Governance and corruption as key factors affecting how countries tackle these issues are given substantial contributions to literature (Robinson et al., (2006), Kolstad and Søreide, (2009)). The wide range of discussions and policy approaches including the Extractive Industry Transparency Initiative (EITI), include how poor governance and corruption – both at and outside the oil industry – affect income management, public spending decisions, and wealth levels in oil producers' countries.

However, both the resource literature ignores the question as to whether bad governance and corruption can influence actual petroleum production.

Recent research of Bhattacharyya Sambit & Hodler Roland, 2010, and Ibrahim A. Elbadawi, Raimundo Soto, 2016, shows that oil wealth, growth, and corruption relationships are dependent upon institutional quality and, in particular, the availability of controls and balance sheets that restrict the abuse of political power and resource rent.

Corruption can also result in a conspiracy between private and public actors, where existing institutional mechanisms make it easier to extract rents. In the absence of transparency of oil-related financial transactions, such mechanisms are maintained and officials have limited liability for such transactions. Because governments have no incentives to achieve proper project selection and public procurement policies, they are likely to allocate discretionary allowances for projects that enable bribing or political incentives to be received (World Bank, 2007). These outcomes in an improper allocation of public resources, which include expenditures for financing which do not focus on the most effective and efficient projects (Mauro, (1996) and Tanzi (1998)). At the same time, ineffective management support for private staff with vested interests is also being encouraged (Kaufmann and Wei, 1999). Governments have also the ability, to obtain a policy or personal benefits at public expense (World Bank, 2007), to control innovations of industrial policy, including the implementation of laws and the granting of exclusive rights and tax incentives.

Oil is almost universally regarded as a strategically important resource. (Daniel Yergin and Joseph Stanislaw 1998) From the governments of the producing countries, oil is one of the "team heights" of the economy, which explains the government's broad involvement in the industry. Government intervention can be varied, from resource ownership to policy and legislation, to control access to resources, infrastructure, and operations regulation before national oil companies are organized. Each form of government intervention can open up countless opportunities for corruption (McPherson, Charles. 2003).

At the level of consumer governments, the understanding of the strategic importance of oil raises strong concerns about the reliability of its supplies. This concern often leads to agreements with producing governments to ensure the security of supplies. Such

arrangements can create conditions for corruption at different levels. New influential consumers from developing countries are making no secret of their desire to secure oil supplies by entering into opaque agreements with producers from developing countries. The largest consumers from developing countries also allow themselves to ensure the reliability of supplies, if not directly involved in corruption, then at least to exploit their economic, political or military influence on producers from developing countries. At the same time, they can tolerate the corrupt behavior of developing country Governments so as not to harm the security of supply. The press has repeatedly shown examples of this contradictory attitude of the Governments of developed countries towards alleged cases of corruption and human rights violations.

Corruption in the oil sector can be characterized by describing the channels through which it is carried out. Below are the four most common types of corruption.

*Political corruption.* The purpose of political corruption is to influence policy in the sector, as well as to adopt laws and tax regimes that bring political or personal benefits to the detriment of the public interest. Condescending foreign policy, tax incentives, price controls, exceptional rights, unique of accounting methods, and a host of specific industry and territorial concessions that are typical of the oil industry — all of this can be attributed to the category of political corruption. Openly illegal actions such as offering a bribe in this area are not always found. A most important role is played by so-called legislative corruption (Kaufmann, Daniel, and Pedro Vincente. 2005.).

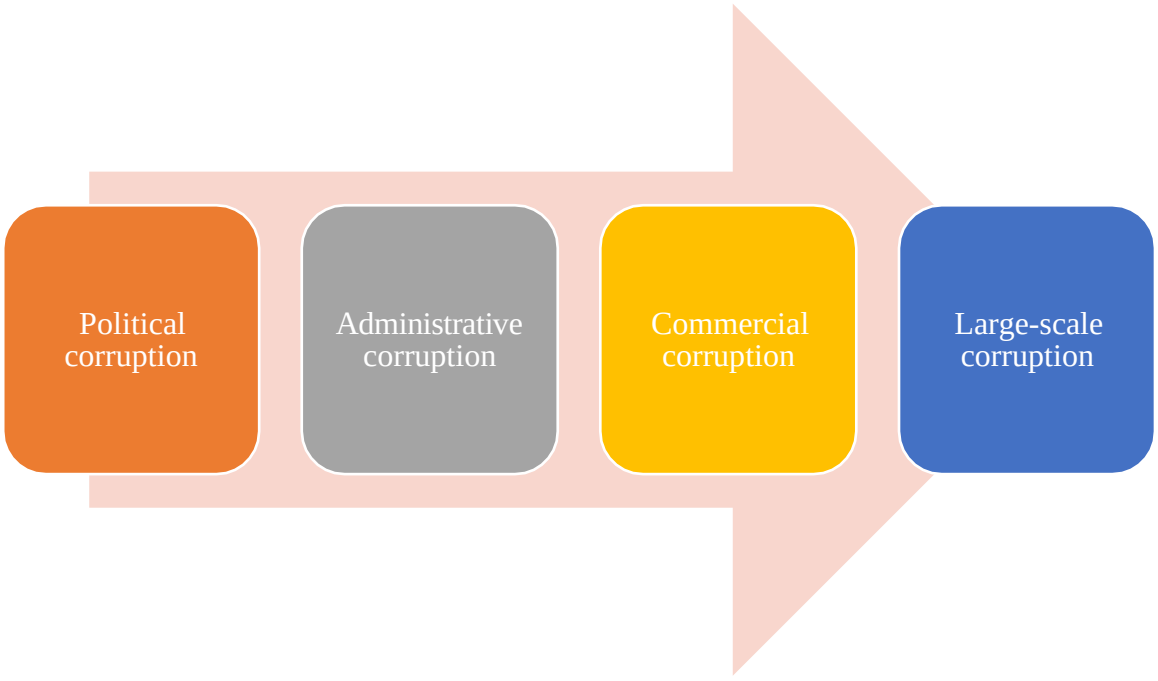


*Figure 1. Types of corruption in the oil sector*

Source: Illustration based [Kaufmann, Daniel, and Pedro Vincente. 2005, Walker 2004].

*Administrative corruption.* With a rank slightly lower than political, this type of corruption is associated with abuse of official authority and illegal receipt of advantages in exchange for approval of a wide array of business and economic processes, for favorable treatment of satisfactory interpretation or corrupt behavior of tax legislation. As in the case of political corruption, the concept of legislative corruption is quite applicable here.

*Commercial corruption.* This is a wide area of procurement abuse, including bid fraud, kickbacks, and inflating costs. Given the volume of industry operations, the scale of corruption in this area is staggering. One of the most recent examples of large-scale procurement abuses is the well-publicized scandals of inflating the cost of rebuilding Iraq's oil sector, which involves mainly American contractors (*Walker 2004*).

*Large-scale corruption.* The direct misappropriation through misuse of production capacity, goods, or incomes of a significant amount of money may also be defined as massive corruption. Investigators allege that General Sani Abacha, the President of Nigeria from 1993-1998, transferred tens of millions of dollars a month from the government's oil revenues to the accounts of offshore banks and companies controlled by his family.

Svensson (2005) defines corruption as the abuse of public office as the basis of personal benefit to justify the underlying theory. The theoretical research on corruption has the advantage of taking advantage of the wider literature to promote criminal activity in situations where the potential costs and advantages of its acts are weighed by fair lawbreakers (Becker, 1968). The theoretical study of corruption Law violators indulges in illegal acts if the predicted benefits outweigh the potential costs. Benefits can consist of preferential care, services not eligible to receive government contracts, or a rejection of the queue to receive services. For natural resources, incentives or export quotas can provide benefits. A fine or a jail sentence may be the cost of engaging in a corruption act. Political, social, and cultural factors affect even the interpretation of the corrupt act. Therefore, the role of the government to counter corruption is twofold: streamline leakage (profit of corruption) reduction procedures, thus increasing the time spent in jail and punishing

responsible persons. The more systematic corruption is practiced by the government, the greater the extent of corruption.

Corruption scientists used these basic theories to explain the motivation to participate in corrupt behaviors and included aspects of corrupt conduct. Throughout the literature on industrial organizations and auctions, this paper is used as a basis for establishing the impact of discretion among government officials throughout terms of the role of bribe-takers and bribe-donors in granting benefits and competition (Rose-Ackerman, (1997), and Shleifer, (1993 and 1999)). In other words, the study of opportunities for unethical practices was the primary focus in this regard. We depend on this study both on corruption theory and the curse of wealth theory.

In comparison, we illustrate the effect on perceptions of corruption of the various tools. The reason for the relation between the availability of resources and the rent-oriented behavior is that the availability of resources transfers focusses from output to resource rental usage of certain entrepreneurs. It makes the synthesis of resource capture competitions (Wick and Bulte, (2006), Brunnschweiler and Bulte, (2007)). Impatience or urgency in obtaining these rents results in demands for bribes (Baland & Francois (2000) for theoretical models, and Torvik (2002), Stevens (2003) for a review of literature). In this context, qualitative differences will influence the tendency for legal or illegal (corrupt) purchases of resources. Agricultural land, for example, is easier to plunder or to tax than mines or oil wells (Mehlum et al., 2006).

Measurement difficulties complicate the calculation of the expense of corruption (Galtung (2005), Heller (2009)). The main difficulties in measuring are: 1 ) different acceptance of the term corruption; 2) differences in the levels of corruption suspected and actual; 3) aggregation difficulties when data are collected from various corruption surveys to produce a single indicator (for instance the transparency international corruption sensitivity index [CPI]), and 4) limited methodologies, that can appropriately demonstrate the causal links between corruption and growth (as opposed to purely associative links).

Most corruption assessments have traditionally been focused on surveys on perception. Such perception surveys benefit from good reporting – asking people for the impression of corruption is much easier than actually assessing corruption directly. The majority of cross-country indexes of corruption, such as the CPI and the World Bank Anti-Corruption Index

are still established. They still have the largest number of international indices for corruption. In some of the first empiric studies on the economy of corruption, such as the Mauro cross-country (1995) research on the relationship between corruption and economic development, perception-based metrics have also been used.

Visions by bribery respondents can be the most effective way of calculating bribery. The stigma associated with paying bribes is fairly low in most cases, and bribery can also be assessed using surveys of businesses or households. An example of this is the study of companies in Uganda by Svensson (2003), who has investigated the amount of bribes they have received. On average, the businesses surveyed report paying approximately $88 per worker or approximately 8% of its overall costs.

Sometimes, the only way to assess corruption is to detect it directly. Needless to say, this is difficult, as officials seldom allow unethical conduct to be observed. There are, however, some important examples of the direct detection of illegal behavior. One such example of a case of Montesinos in Peru, reported by Mr. McMillan and Mr. Zoido (2004). Montesinos, who was the head of the secret police under President Alberto Fujimori in Peru, bribed judges, politicians, and news media to support the Fujimori dictatorship. Incredibly, he maintained meticulous documents, signed contracts of bribery, and videotapes of bribery, which became public after the collapse of the Fujimori regime. Mr. McMillan and Mr. Zoido use them to measure the expense of bribing different forms of government officials. On average, politicians received bribes ranging from USD 3,000 to USD 50,000 per month, depending on whether the politician was in the opposition party (higher) or the Fujimori party (lower), with judges receiving bribes of the same magnitude. The media bribes were orders of greater magnitude — as much as USD 1.5 million a month for the sponsorship of one television station.

In certain situations, the market balance principle, combined with market activity data, can be used to estimate the amount of corruption. In a pioneering analysis, Fisman (2001) used this method to estimate the importance of political relations with Indonesian President Soeharto. Furthermore, he received an estimation from the Jakarta consultancy firm of how much every publicly traded company was linked to Soeharto on a scale of 0-4. He then calculated how far the price of each company jumped when Soeharto fell ill to measure the importance of such political relations on the stock market. If the market hypothesis is effective, the change in the value of the stock market surrounding these events will capture

the value of the political relationship with the firm. Because investment bankers in Jakarta calculated that the overall market would decline by 20% if Soeharto died, they can calibrate these figures to estimate the total value of Soeharto 's connections. On the net, the most affiliated firms estimate that Soeharto's connections accounted for about 23 percent of their value.

It is widely held that "good governance" is required for growth to take place. This implies that corruption must be bad for growth. Empirical studies present a more complicated picture (Carothers and de Gramont, (2011), Norris (2011), Zhuang et al., (2010)). A significant body of research shows that corruption levels do not explicitly assess economic development rates. Many other governance parameters besides corruption may be much more important.

Zhuang et al. (2010) find in a study of developing countries in Asia that policy performance, the rule of law and the standard of regulation are stronger linked to economic growth than corruption, voice and accountability (V&A) or politics is correlated with.

Many cases of profit diversion from commodities trading have been recorded since the end of the 1990s. Some of these case studies have been carried out by foreign organizations (World Bank (2000), in connection with the oil for food scandal: IIC (2005)). Others originate with non-governmental organizations (e.g., GW 1999; 2002; 2005; 2006; 2013; BD 2013a; 2013b; 2015; NRGI, 2015d). These cases are often restricted to the newspapers. Case studies are less often supported by court documents. These cases show that the above-mentioned risks occur and offer valuable insight into the strategies and methods used. However, attempts to systematize such data – and to analyze patterns – are seldom. While the OECD study did not contain a summary of trade data, it is one of the two exceptions that we have found. This helps us to draw some conclusions about the position of intermediaries in 49 out of 130 cases of natural resource corruption. It allows one to take into account the scope and sophistication of corruption schemes. Of the 130 incidents, 21 involved complex transactions in which various shell companies were involved (OECD 2016, 7). Secondary literature also recognizes the position of these actors, who are euphemistically referred to as business people or big people (McPherson and MacSearraigh 2007, 207). Those findings are also consistent with the results of an inquiry into illicit financial flows, in particular the widespread use of shell companies for covering fraudulent transactions or obstructing judicial proceedings (WB, UNODC, and Star 2011). Secondly, the 2016 NRGI study

investigated eleven cases of oil or gas abuse (NRGI 2016). The research also reveals that collusion exists at various stages of sales from choosing customers to decide on purchases and transfers of funds. These two reports explain in detail the steps to prevent such robbery.

## 1.2. Specificity of corruption in oil industry

The use of intermediaries between the public body and the final buyer in some situations is more complicated. The process is simple: instead of directly paying bribes, goods are sold to the recipient State – often to postal firms – to intermediaries at a discount and instead, these intermediaries sell them to well-known merchants at nearly instant market price. The beneficiaries of the intermediary who can become a PEP in the receiving State or an individual near to the PEP (Fig. 2) have an unjustified income. By placing an intermediary under an appropriate competence, beneficiary owner may remain anonymous and reduce income taxes for their company.

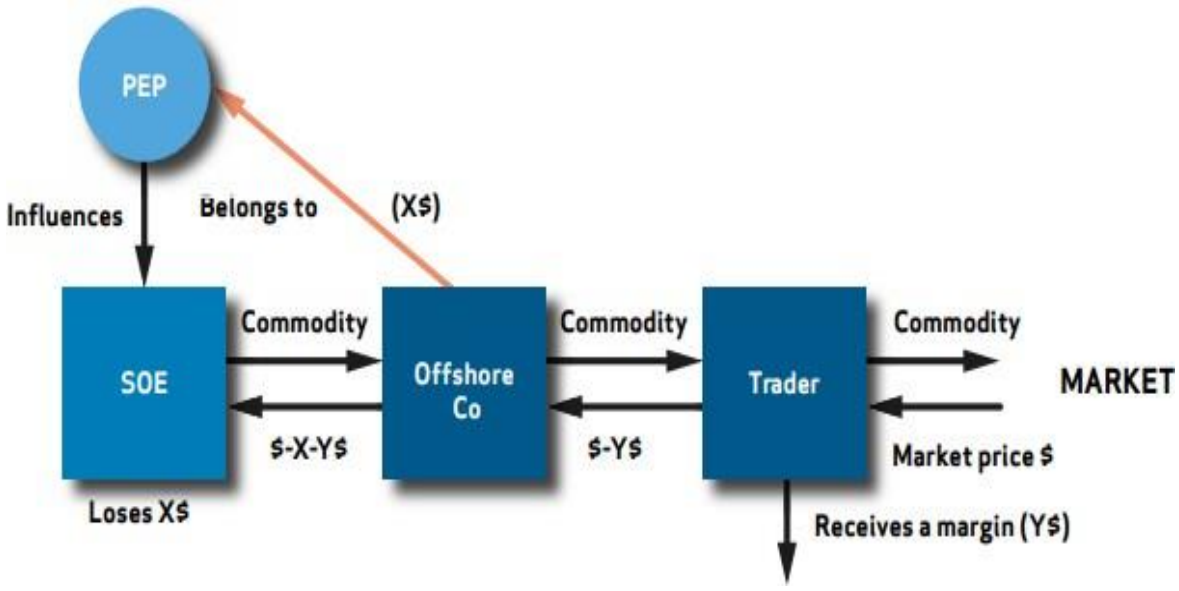



*Figure 2.* The mechanism of corruption in oil sector

Oliver Longchamp and Natalie Perrot: Anti-Corruption Resource Centre

*Case examples*

A striking example of such a scheme is the company Philia, based in Geneva. Philia was founded in October 2012 and has no world trade experience and in 2013 was granted a

special contract by the Congo (Brazzaville) oil refining firm Coraf, without public tenders for exports of petroleum products. This means that Philia acted as a broker between Coraf and the foreign market and sold their cargo at no extra cost to third parties – generally established traders. He took the margins by providing a logistics service that virtually did not exist. Filia belongs to a shareholder who is a friend of the son of the Congo President. Finally, he is also Coraf's General Manager and signs the contract which has been so beneficial to Philia (BD 2015). The sole shareholder declined to have a business arrangement with the son of the President when the investigation started. The release of subsequent Panama studies however revealed that Philia 's owners and President's son had contracts in Mossack Fonseca with the same offshore company (Tilouine, 2016).

Identifying corruption-prone governance practices is one of the EITI's most valuable and unique contributions to combating corruption. The EITI research has established processes and procedures in a number of countries that may easily lead to corruption if this is not done already. Such vulnerabilities are also country-specific and are therefore especially effective in recognizing them by the country-specific nature of EITI studies. Substantially discretionary licensing decisions are the related processes opened through EITI; extra-budgetary accounts subject to control restriction; transfer of money or non-accumulated goods; money-purchases but little-doing subsidiaries; license holders who do not fall under the jurisdiction of the tax authorities; legal and regulatory provisions to encourage corruption. The EITI study identified common activities and was closely checked by representatives of the MSG and other stakeholders. This led to a reform in some cases. This powerful, dynamic can limit corruption in the system to some of the easiest ways.

When the EITI first emerged at the market, some observers thought that all of the dirty dealings in the sector might pull the curtain back. Indeed, in some cases, EITI reports contain data that is initiated or informed about further investigations of certain transactions with external parties. One journalist revealed several mining enterprises in Cameroon using EITI reports in Liberia. xi. Indonesian non-governmental organizations (NGOs) used EITI data to demonstrate that mining firms operate out the front of their territory, as well as in protected forests, and the Global Witness and The Guardian used EIT-ID data to raise questions about the licensing transaction. In its investigations on the DRC's largest state-owned mining company, the Carter Center and the Global Witness used EITI reports.

At present, some actors are discussing the EITI to over-sell their ability to fight corruption and discuss its involvement as evidence of a well-controlled corruption (the challenge of "whitewashing" mentioned above). Others unfairly criticize the EITI for continuing corruption in its member countries or for poorly assessing cross-national corruption measures. The EITI could make its role in the fight against corruption more clearly known. This enhanced message could:

• Explain the strengths and limitations of the EITI, as described above;

• Address corruption more explicitly in the various implementation documents, including to justify why certain types of information are required to be disclosed;

• Recognize openly that some participants of EITI are facing serious corruption challenges and that validation does not measure corruption control;

• Compile evidence of how the EITI is trying to fight corruption, such as through more systematic study of the uses of EITI data noted in Section II; and,

• Make it clear that the EITI is just one part of what is needed to curb corruption in the extractive field and cannot be a proxy for a sufficient reaction against corruption. The Secretariat could guide how different stakeholders should communicate this nuance, for example by signing up companies, describing good validation results, or applying EITI-related conditionality by donors. The Board may address the issue of "whitewashing" and give the practitioners a cautionary note.

We have also attempted to demonstrate why corruption so badly impacts the oil sector, identify ways of corruption and list the main players in corruption relationships, and list the types of corrupt practices in each link in the oil industry's value chain. This final segment addresses alternative solutions and strategies to tackle corruption. We should, however, make a few reservations before making any recommendations. First, it should be remembered that the corruption attractiveness of the sector is extremely high. Interest groups that oppose reform are very powerful and do not lack funds. All the investigations mentioned here are about corruption networks, not individuals, and these networks are most often international. One network generates another, causing the networks to spread like an infection. For this reason, eradicating corruption in the oil sector is an extremely difficult

and even dangerous task that can take a long time to solve. A sustained and strong commitment to fighting high-level corruption is essential for success here.

Secondly, anti-corruption programs in the petroleum sector would have a much greater chance of success if they are incorporated into a wider national system to improve international governance and corruption. Fortunately, thanks to the Internet and other means of communication, the international community and local communities are very well aware of the ravages of corruption, and reforms today have a broad base of supporters.

Thirdly, and in other areas too-governmental, industrial, civil society, financial, development, and development organizations such as the World Bank and the IMF-depend on the successful fight against corruption in the petroleum industries. As developing countries are often overlooked here, their role and responsibilities need to be given particular attention. There is a tendency to view corruption in the oil sector, particularly in the context of development, as a problem in the developing world. However, for several reasons, this approach does not correspond to reality. As the examples in this section illustrate, in developed world cases corruption also exists directly or indirectly between corporations and organizations in the developing world, as well as in the governments of the nation in which they are based. While this may be difficult to achieve by many standards, diplomatic and otherwise, governments in developing countries should make an effort to stop sending ambiguous signals to countries fighting corruption in the oil sector.

The strategic essence of oil has a destructive effect on the values of the most influential developed countries of the world. Too often, simultaneous praise for governments in countries with high levels of corruption undermines the effectiveness of sectoral campaigns which can be carried out through bilateral or multilateral means with the support and consent of developed countries – praise supported by developed countries' interest in securing or prevention of oil supplies. However, the behavior of too few players across developing countries in comparison to more aggressive activities shows that corruption is not just an alien disease polluted with abroad by westerners. Quite the other way around! Corruption has deep origins in the developed world, and a toxic combination is created when the West's greed meets development politics. An adjustment against corruption in the petroleum sector, which exclusively or primarily focuses on developing countries, is bound to fail.

Fourth, the fight against corruption in any industry, including the oil sector, requires resources-certain knowledge and abilities and adequate funding. The required set of resources ranges from managing information campaigns, technical support, the ability to set up government agencies and build civil society, conducting complex investigations, and conducting surveillance. You can't go far with rhetoric that isn't backed up by resources. And finally, it all depends on the situation. A crisis, for example, maybe the most favorable moment to launch an anti-corruption campaign. As a priority, the oil sector was centered as the local and foreign public viewed it as the most corrupt, and corruption was spreading from the oil industry not just to other sectors of the economy but to society in general. The oil sector received priority attention. Subject to these reservations or concerns, the desirable characteristics of any anti-corruption initiatives should include leadership or support, a reform context that goes beyond the oil sector alone, a coalition of supporters, adequate resources and funding, favorable conditions, and a willingness to "seize the opportunity".

**Table 1. Corruption in the oil sector: summary characteristic**

| Value chain in the oil sector | Corruption vulnerability | Signal indicator | Recommended countermeasures |
|---|---|---|---|
| Exploration | * Policy formulation<br>* Laws, contracts, taxation<br>* Licensing,<br>Conclusion of contracts<br>* Obtaining permits and visas | * Lack of clear policy;<br>* Non-transparent, incomplete legal framework and tax system;<br>* Direct non-transparent negotiations<br>Under license;<br>* "Unbalanced"," suspicious " choice of contractors;<br>At the conclusion of contracts;<br>* Delays in granting permits and obtaining visas; | * Clear, publicly announced policies;<br>* Improving the legal framework and tax system;<br>* Transparent, simple tenders for obtaining licenses, publication of results;<br>* Transparent public reports on issuing permits; |

Table 1. Corruption in the oil sector: summary characteristic (to be continued)

| Value chain in the oil sector | Corruption vulnerability | Signal indicator | Recommended countermeasures |
|---|---|---|---|
| Development and production | * Obtaining permits and visas;<br>* Custom;<br>* Theft of products or revenue; | *Delays in granting permissions;<br>* Limited use of the international competitive bidding procedure,<br>Tenders, non-transparent tenders;<br>* "Suspicious" or repetitive selection of contractors during procurement;<br>* Rumors of abuse;<br>* Aggressive rhetoric about national interests;<br>* Differences in energy;<br>* The lack of consideration; | * Transparent public reports on issuing permits;<br>* Transparent competitive procurement procedure;<br>* Publication of results; • Reliable procedures for the appeal or contestation;<br>* Regular volume control and reconciliation; |
| Trade and transportation | *Understating the cost or volume;<br>* Illegal rent-seeking to access to the infrastructure; | * Prices are below public guidelines;<br>* Differences in energy<br>* Non-transparent sales reporting or lack of reporting;<br>* Unusually wide use of intermediaries; | * Full open trade and sales reporting;<br>* Openness tenders for choosing intermediaries;<br>* Periodic sales audit;<br>* Amount of checks and reconcile; |

Table 1. Corruption in the oil sector: summary characteristic (to be continued)

| Value chain in the oil sector | Corruption vulnerability | Signal indicator | Recommended countermeasures |
|---|---|---|---|
| Trade and transportation | | * Misuse reports;<br>* Infrastructure Connection Queues; | * Clear well-known network control rules and tariffs;<br>* Appeals and complaints procedures; |
| Processing and marketing | * Formulation of policies in the final market, such as price regulation;<br>* Black market, smuggling;<br>* Falsification of petroleum products;<br>* Purchase of petroleum products; | * Price control;<br>* Non-transparent; purchases of petroleum products;<br>* Queues, shortage of oil products;<br>* Difference of volume; | * Clear policy;<br>* Liberalization of prices (transparent allocation of income);<br>* Competitive, open tenders; |
| Enterprise accounting and Finance | * Inconsistent reporting;<br>* Tax evasion;<br>* Misuse of funds;<br>* Money-laundering; | * Limited transparency, secrecy;<br>* Tax exemption or unusually low tax burden;<br>* Poor quality audit; | * Comprehensive, transparent audit, publication of audit results;<br>* Qualified and independent tax and cost audits; |

McPherson, C. and Mac Searraigh, S. (2007), Corruption in the Petroleum Sectors, p. 191

The map for the official mentioned at the commencement of this Chapter is summarized in Table 1. He splits into many sections the value chain in the oil sector,

identifying places that are vulnerable to corruption, suggesting signs, and providing suggestions for combating corruption. The problem of corruption in the oil sector is extremely serious, but the results of success should be no less impressive, in any case, they are worth fighting for. A better understanding of the phenomenon, new initiatives and a reduction intolerance towards corruption give hope that efforts to combat this phenomenon have not been wasted.

## 1.3. Theory of Trade

Trade is a growth driver that creates employment, reduces poverty and increases economic opportunities. Because of the global development underpinned by free trade since 1990, over one billion people have been rising out of poverty. The World Bank Community is supportive of a free, transparent, stable, foreign trade environment. By providing customers more competitive products and services, free trade provides important, yet ignored advantages to lower-income households. Developing countries also contend with indirect factors impeding their exposure to foreign markets, such as anti-competitive trading policies, regulatory conditions unfavorable to corporate development and innovation, or insufficient infrastructure ability. Even a country with a free and open foreign strategy loses if its economies become unconnected, because many of the world's poorest citizens reside in countries that are landlocked, isolated, or even poorly supported by international trading ties. Through addressing these obstacles, the World Bank Community helps its member countries strengthen their exposure to developing country markets and increase their involvement in the world economy. Trade will contribute to job reductions in many regions and sectors, despite the economic growth and the technical advancements that follow it. The World Bank Community is working to promote strategies that enable all countries to take advantage of the prospects emerging from trade and technological change. These include short-term responses such as training programs and job search assistance, but also long-term solutions that build more resilient economies. The world needs to strengthen the global trading system to promote greater inclusiveness and help developing countries address trade-related constraints to growth. Tensions are confronting the framework of global trade laws that have nurtured exponential economic development over multiple generations. Such strains would not preclude future trade regulation could stop the global economy from looking at the specific untapped benefits (World Bank,2019).

International trade is critical to the development and is a primary factor of globalization and local market prospects. Export finance is important for the transport of products at all levels of the supply chain, which can have a significant effect on developing countries (World Bank,2015).

From an international economic viewpoint, Dutt and Traca (2009) offer one of the most compelling explanations of the beneficial consequences of corruption, describing circumstances in which border corruption can improve trade. Nevertheless, there are no clear signs as a standard rule of thumb that corruption spurs economic growth. The same standard approach to gravity used to forecast bilateral trade flows stems from Newton's physics gravity equation which predicts the gravitational force between two point masses.

According to Thedeγ S. and Gustafsonη N. (2010) because of its good explanatory capacity, the application of the gravity formula to the estimation of trade flows is very common, and our methodological definition relies on a considerable literature covering the correct usage of the gravity equation based on economic theoretical underpinnings and econometric considerations. The methodological approach of this research has been inspired in particular by the interventions of Anderson and Marcouiller (2002), Anderson and Wincoop (2003), Dutt and Traca (2009), Helpman, Melitz, and Rubinstein (2008), and Silva and Tenreyro (2009). Anderson and Marcouiller (2002) and Anderson and Wincoop (2003) demonstrate that in order to make reliable forecasts of reciprocal product movements, account must be taken off the export effects of national price indices. Helpman, Melitz, and Rubinstein (2008) demonstrate how systematic trade theoretical advances on firm heterogeneity can be integrated into the definition of the gravity model while Silva and Tenreyro (2009) discuss their methodological definition in depth. As mentioned earlier, Dutt and Traca (2009) provide an equation of gravity which integrates the effects of border corruption on trade.

Kruger (1974) introduces the first exchange and rental system. Quantitative controls on imports grant legal importers monopoly rights, thus creating incentives for commercial practices aimed at obtaining rents (in comparison to tariffs, the Quotas, and other official permits). Agents may enter into legal competition or unlawfully engage in rent-seeking activities such as smuggling, black markets, bribery, and corruption. This practice, Kruger shows, causes a divergence between social and private costs and forces the economy to

function in a sub-optimal way. In addition to trade barriers, the economy still faces social security costs.

## 1.4. Research on corruption and trade

The effect of corruption on trade is discussed by De Jong and Bogmans (2011) and shown that corruption has an influence on trade as a whole. This can be demonstrated by the extra expenses incurred by both importers and exporters. But abuse will also contribute to reduce the expense of inadequate border controls. Corruption has a positive impact on imports in its role as a "pace currency" (De Jong and Bogmans, 2011). In this situation, cheating acts as a means to resolve more profoundly ingrained flaws or inefficiencies, in the context of poor procedural productivity for example.

Wei (2000) suggests another framework for clarification of trade-corruption ties and takes into account the costs and benefits of public officials monitoring. He argues that the efficiency and the ability of the institutions to fight corruption crucially depend on the money the country has earmarked for this purpose. A nation spends more when its advantages outweigh costs to boost the efficiency of these internal institutions.

To check the argument that restricted trade shifts capital from productive activities to rental activities, Torres (2002) examines the relationship between trade and corruption. The study has shown that a negative relationship exists for more empirical evidence, but it is not trustworthy.

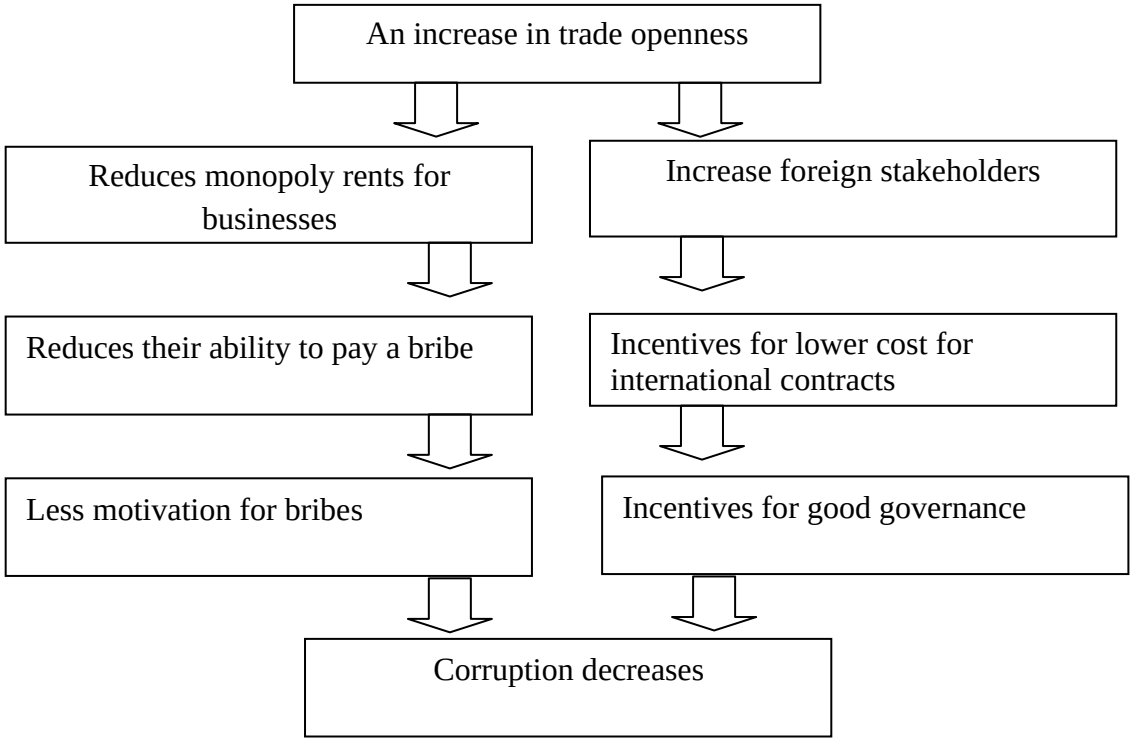
In the former Soviet Socialist Republics Union (USSR), where required measures to privatize the economy and reform trade rules following the collapse of socialism were often followed by systemic corruption, evidence of positive ties between trade openness and corruption was first found in the transitional economies of Eastern Europe (Transparency International 2005, p.271).

Openness to trade can also generate new corruption opportunities. Tanzi (1998) states that liberalization of trade generates new incentives for corruption, including the value of bribery in securing international contracts or preferential market access, or such similar benefits as tax cuts. Bribery maximizes government and corporate shared interests. Politicians want the re-election to remain in control, and they need money to finance their

campaigns, while companies need opportunities. Politicians, therefore, have an opportunity to grant payments to businesses or other benefits.

These studies show that further policy changes are necessary to ensure a positive welfare impact. Such studies do not, however, equate more institutional reforms with corruption. Similarly, trade and corruption literature lacks the importance of more institutional changes in the fight against corruption. This study explores this discrepancy by stressing the importance of more policy changes to reduce corruption.

**Figure3. Theory of corruption decreasing trade**

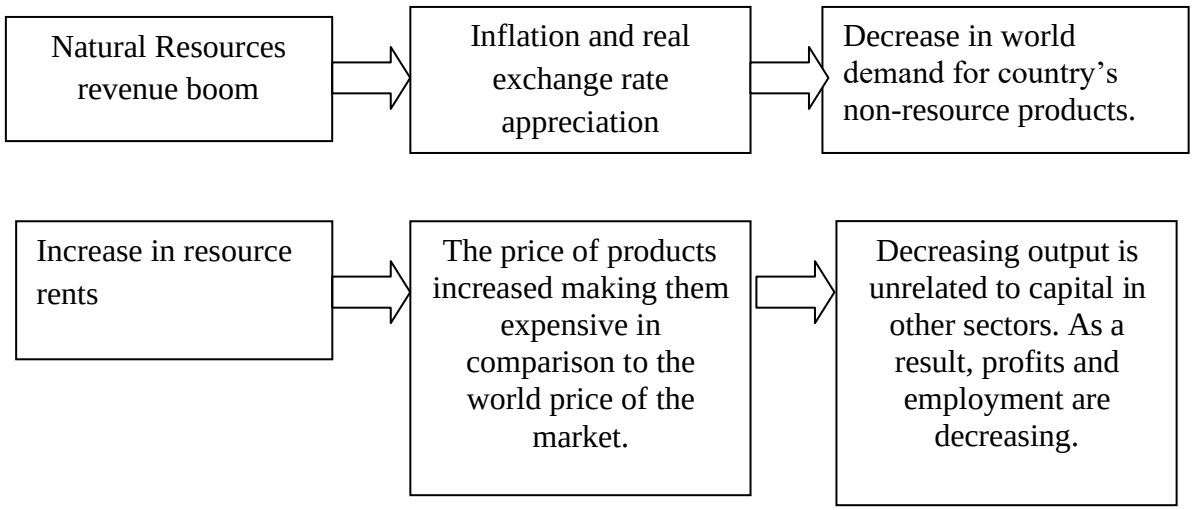



Source: Krueger (1974), Ades and DI Tella (1999), Wei (1999), Gatti (2004)

To research the economic growth function of natural resources, the mechanisms that connect natural resource availability with low economic indicators need to be investigated. The literature addresses many political and economic explanations why natural resources have not been translated into economic development, such as Dutch diseases, political rents and corruption, low institutional efficiency, commodity market volatility and a lack of diversification.

The Dutch disease is one of the most famous supposed economic explanations for the resource curse. In most resource-rich countries non-resource sectors are likely to be influenced by a major national monetary increase as the resource income from natural resources is partial to domestic non-tradable sectors (Corden and Neary (1982), Sachs and Warner (1995), Papyrakis and Gerlagh (2007), Iimi (2007)). This makes products from non-resource industries (normally manufacturing) more expensive relative to the world market and less competitive in these industries. As a result, the net national income falls, resulting in economic growth slowing down. It is called the "waste effect" of this process.

**Figure 4. The spending effect in the 'Dutch disease'**




Source: Badeeb, Lean and Clark (2017).

The so-called 'resource curse' is rich in literature. Some data from across the Developing World suggest that natural-infrastructure rich nations, in particular, due to the momentum and stimulus that resource-growing industries aspire to develop for the governing elites (Asemoglu and Johnson, (2005), Humphries et al., (2007), Vicente (2010) all surveys, Standard 2-stake analysis and other survey results, Standard 2-stage regression analysis).

Results of resource management studies indicate that the increased autonomy of people by the state decreases the need to establish long-term specific political agreements with different classes of society for state representatives (Sogge, 2006). The abundance of oil and diamonds and other resources, including gold, was, if not, a major factor in weakening

transparency, fracturing the bonds between government and society, and enabling those in charge to operate large patronage networks while being oblivious to the general public. In reality, it leads, inter alia, to an overall impression that public services are a public benefit rather than a benefit in the argument, thereby undermining vertical accountable mechanisms (Moore (2004), Unsworth (2010), comparative case studies) that a state does not rely on its people to increase income. Besides, the allocation of resource supplies and mining rentals may have important effects on conflict and cause difficulties in stable society-to-peace co-existence (Collier (2006), DiJohn (2002), Le Billon (2012), Williams (2010)).

Auty studied economics and geography, and he investigated the reasons why some resource-rich countries underperform and remain undeveloped in spite of the abundance of natural resources in the country as in the case of Nigeria. In other words, Auty defined the term natural resource curse as the perverse effects of a country's natural resource wealth on the country's economic, social, or political well-being (see Rose, 2014 Cited in Mehrdad, 2017: 2).

*Azarhoushang and Rukavina (2014)*, and *Mellissa (2017)*, in their respective studies of the resource curse theory, lumped the term with the Dutch Disease, an idiom used in association with a 1960 crisis in the Netherlands after the discovery of natural gas in the North Sea region of the country. They saw the phrase as the appropriate word to describe what happens when an event, like a commodity-boom, makes a country's currency more expensive and its other goods less competitive. *Akpotor (2016)* stated that the Dutch Disease or Resource Curse theory is used to examine the negative effects that rich natural resources bring upon the economic growth of a resource rich country. To him, it is paradoxical for countries with the abundance of non-renewable natural resources to experience stagnant economic growth and contraction often associated with conflicts or crises of marginalization of the host community. For Duruji and Dibia (2017: 63), Resource curse is also known as the Paradox of Plenty and Moses Duruji, Okachikwu Dibia, 2017, describe the failure of many natural resource-rich nations to benefit fully from the wealth of their rich natural endowment following the inability of their governments to respond favorably and effectively to public welfares and needs. In a more elaborate manner, *Azarhoushang and Rukavina (2014)* argued that rich natural resources such as oil deposits and some significant others which are located in abundance in some countries have become a trap or a curse rather than being a blessing to the countries. The reason can be traced to the way and manner in which

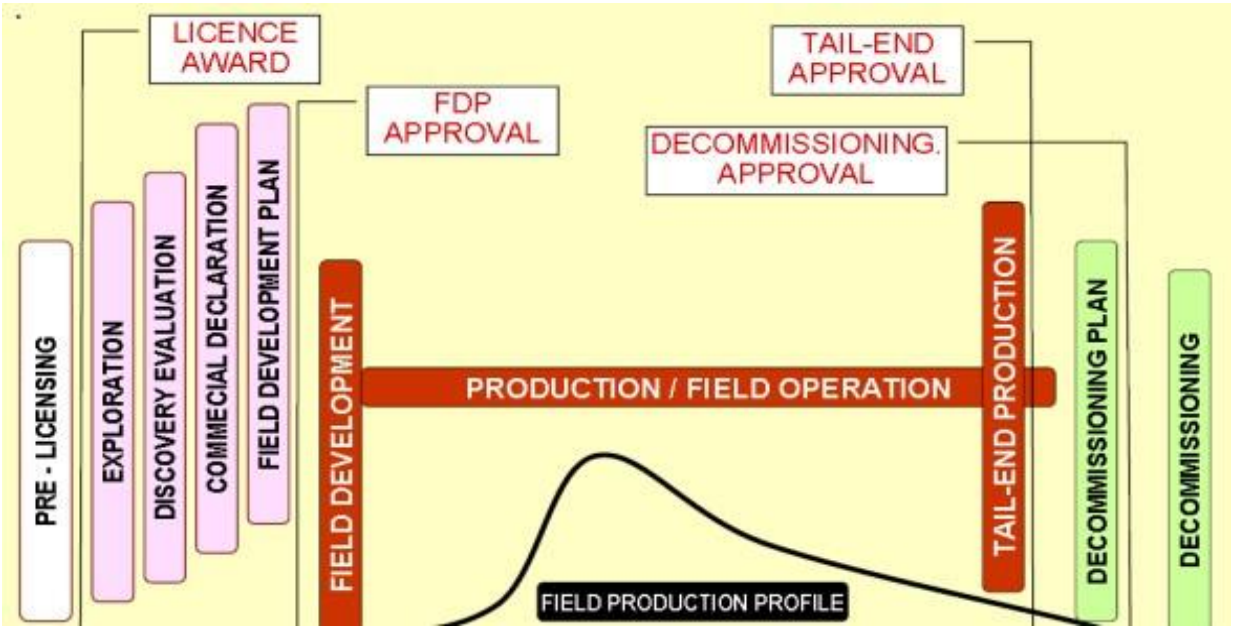
the resources are managed right from the exploration stage by the multinational companies, through to the attitude of the home governments of the countries in which the resources are located, made worse by the activities of the local elite class as influenced by foreign and external forces of the developed nations of the world. According to Azarhoushang and Rukavina, the actions of these individuals and institutions have, in most cases, resulted in regular weak economic performance, the creation of long-lasting ineffective institutions, socioeconomic stagnancy and political backwardness, they argued. *Venables (2016)* argued that most of the oil-rich nations, rather than cultivate the culture of diversifying their economic system to a macroeconomic based system, they embrace a mono-economic policy which has resulted into over-reliance of crude oil exports which is detrimental to the country's economic growth as evident in Nigeria.

The oil industry must be regulated for many reasons. Each country has its oil and gas resources and access to them is required. For this to happen in an orderly manner, a state system and appropriate legislation are necessary. Other regulatory reasons are related to technology transfer, the need for security, the need for revenue control systems, and the need to protect the environment. If not governed by law, details related to these considerations are contained in the oil-exploration or production license contract and will generally replace existing regulations for this concession period. These agreements can indicate serious risks of corruption. For situations where government officials are required to follow the requirements laid down in the contract instead of in the law, the state's regulatory ability is likely to be reduced. Conflicts resulting from various Treaty definitions will be subject to international arbitration, not national court arbitration, which would mean decreased national power. Also, contract variations probably reflect the interests of individual firms that make government oversight difficult. In all cases, the regulation of the petroleum industry includes decision-making that is essential to government revenues and business income, and many players want to influence these decisions.

How oil operations are regulated vary from country to country, as do the stages associated with oil exploration and production. Typically, regulatory regimes cover the licensing stage, the exploration, production or exploitation stage, and the post-production or decommissioning stage. Figure 5 shows typical regulatory stages of oil operations. Approval of the Field Development Plan (FDP), endorsement of the Final Plan, and endorsement of

the decommissioning step are the key steps. At any point in this process, incentives for corruption will occur as discussed below.

**Figure 5. Milestones in the relationship between government and licensees**




Source: Petroteam AS

The literature review in this study also indicates that rich states are usually often more effective to manage, although causality has been hard to determine (for instance, whether countries are wealthy because they are better governed or better managed because they are wealthy). The typical collection of "good governance" (and corruption in particular) metrics are not related to the pace of growth (Meisel and Ould Aoudia, 2007). Short to medium-term differences in growth rates are not related to governance differences as the traditional "good governance" prescriptions, including corruption, understand (Williams et al., 2009). As Khan (2006) has demonstrated, there are no significant differences in governance quality in studies comparing more or less successful emerging economies.

The petroleum sector is increasingly moving toward stronger host governments and national petroleum companies. Private oil firms, including the "seven sisters," are less likely in many countries to control or enforce working standards and are less likely to benefit financially. As per Robinson "Foreign firms are no longer running businesses.", PFC Energy President: "Western oil corporations are politicians, now. They manage the company. "There is significant uncertainty with big companies in the sector about their future profits, despite record-high oil prices.

Along with the sector's changing face, annual oil reserves are continuously lagging anticipated demand growth. Despite the knowledge, that the conventional petroleum resources of the world are dwindling and that they need to be used effectively, large quantities of petroleum will never come up as production in many countries is under optimal. To maximize early production, oil companies prefer quicker income generation. This can be achieved conveniently at the cost of greater oil recovery if resources were extracted over longer periods and with sufficient recovery steps.

Significant contributions to the literature in the resource curse indicate that poor governance and corruption are key factors behind the large social divide in oil-producing countries. The broader debate is about the poor governance and corruption, the effects of revenue control and spending decisions, and the future benefits generated from oil. However, it has attracted little attention to how they affect the volumes of oil produced. This chapter brings together a study of the resource curse and petroleum production literature with qualitative findings from interviews with experts from the oil industry to understand how related corruption to oil production was below its potential.

**Table 2. Potential consequences for the regulation of oil.**

| Oil politics and regulatory decisions | Welfare-focused and honest government, no risk of corruption | Welfare-focused government but risk of corruption in regulatory structures | Corrupt political elite with short-term horizon. High prospectivity and production levels | Government displays lack of capacity and competence | Government under stress —poverty, civil unrest, instability at political levels, influence from energy-hungry foreign governments |
|---|---|---|---|---|---|
| *Crucial ambition (actual unofficial ambition)* | Environmental development: long-term | The ambition is sustainable development, whilst the | Incentives for short-term maximization of growth. | The goal is sustainable growth, but actions that | Avoid loss of power over develop ment |

**Table 2. Potential consequences for the regulation of oil (to be continued)**

| | | | | | |
|---|---|---|---|---|---|
| *behind oil production* | maximized profits reinvested in sustainable values. The effective institutions. Efficient institutions. Clear regulations and rules on petroleum. | present regulation is different from good practice. | Support based on populist arguments. Unclear legislation. | do not fulfill that aim are made. | politics and prevent coups. Using oil capital for limited strategic advantage s. Military financial update. |
| *Structures of ownership and legislation.* | Foreign entry welcome. Limited, separate regulatory and commercial functions of the national company authority. | Without corresponding output, the national oil company is ambitious. International petroleum participation is being slowed down by bureaucracy. | Powerful national petroleum company directly under President or Minister with the business role and regulatory control or regulatory functions. | As regulators or bureaucratic supervision, the national oil company dominates. Divergence between planned and actual performanc e regulatory functions. | Production superficial control. More vulnerabili ty in regulatory systems to corruption. |
| *Award of access to oil resources.* | Procedures and criteria clarity. Pre-qualifying. Bidding competitive. Discretion in accor- dance with assessment transparency | Companies may access tendering criteria and procedures through undue influence. Operators accepted without the required | Based on bonuses for signature. Round concept/aucti on – to promote fast start-ups. Poor incentives to invest in exploratory wells for | Operators propose how to tender even if they are competitors themselves. | he award process is used systematic ally, formally across rounds. |

Table 2. Potential consequences for the regulation of oil (to be continued)

| | | | | | |
|---|---|---|---|---|---|
| | | capacity. More need for track record data. | drilling. Less focus on improved track record for recovery. | | |
| *Field develop-ment plan (FDP).* | Creating communicatio n between licensees and authorities. Maximized complete resource recovery at optimum NPV. | And if the desires of the client were split, the FDPs approved it. Speedy production emphasis and less regeneration optimal. Local material unreasonabl e requests. | FDP agrees only if, irrespective of the effect on the overall recovery of capital, output is maximized in the short term. | Companies have a greater negotiating power in relation to government and more reservoir information. For operators, FDP decisions will reap big benefits. In a politically challenging situation. | FDP may be less important and possibly left to the regulatory level, but without the support of higher officials. |
| *Overview and control of production* . | Multi-angle regulation (oil authority, businesses, finance ministry, central bank). Revenue control and transparency. | Substantial oversight of legislation. Manipulated production figures. It's hard to install or audit a metering system. | Companies may reduce investments and optimize high performance . Weak official control. Weak official control. Approval method Shallow assessment. | On-the-field documentatio n and production figures were limited to government capacity. Development activities of operators and official figures acknowledged . | Minimum focus on production monitoring . |

Table 2. Potential consequences for the regulation of oil (to be continued)

| | | | | | |
|---|---|---|---|---|---|
| *The tail-end game* | Companies dedicated to "tail-end production" have been invited. | Tail-end development is less likely for operators. The ambiguity of the contract is prevalent in the movement. | Output at tail-end is not a priority, but it is facilitated by decreasing cash flow. | Limited understanding of how tail-end production solutions can be promoted. | Authorities may not be completely aware of the probability of volume maximization or have little interest in it. |

Source: F. Al-Kasim et al. / Energy Policy 54 (2013) 137–147

# II. RESEARCH METHODOLOGY

The aim of the methodology part in this research is the specific procedures or techniques used to identify, select, process, and analyze information. At the beginning of this work presents methodology according to econometrics calculations. After was reviewed statistical data and presented several hypotheses that were formulated in accordance with the previous research. And was review the measurement of the corruption and the evolution of trade in oil exporting countries.

## 2.1. The Ordinary Least Squares estimators and Poisson Pseudo-Maximum Likelihood estimators

The technique in every study generally relates to the actions the researcher has taken to address the question that occurs in the research process. As this study is an economic analysis study focused on evaluating oil exports and the presence of corruption in countries and how it influences international trade, the econometric approach would be used to calculate or test foreign relation parameters focused on sample observations. The objective of the study is to determine the extent to which explaining variables affect the dependent variable over a certain number of years.

We wanted to use a quantitative data collection approach for the research methodology. We will choose several countries for the estimation of the impact of corruption on trade in oil exporting countries and we will analyze their economy and how corruption affects the economy and the growth of the country in general. Selected for the analysis countries have a different level of corruption according to CPI (Corruption Perception Index) and these countries export oil (trading economics.com), also this part reviews techniques, which will be used to assess empirically the analysis between international trade and corruption in oil-exporting countries which effect on trade. To estimate the Augmented Gravity model, Robust Ordinary Least Squares (OLS) and Poisson Pseudo-Maximum Likelihood estimators, with and without fixed effects, will be used. All the calculations and estimations which will be written below will be provided with EViews software.

Most papers investigating the effect of corruption on international commerce use the increased gravity model that derives its name from the analogy of Newtonian physics. As

we mentioned before, for the analysis of impact corruption in oil exporting countries we will use a gravity model. It was decided that the best method for working with international trade the gravity model because gravitational models of trade are one of the most important tools for empirical analysis of international and interregional trade flows. The first scholars who used the gravity equation to evaluate foreign trade movements were *Tinbergen (1962) and Pöyhönen (1963).* The gravity model has since grown into a common instrument of the scientific study of international exchange. This model has been successfully applied to movements of different types, including relocation, capital flows, and, more specifically, international trade. This model defines exports from the country i to the country j by their economic size (GDP or GNP), territorial ranges, demographics, and dummies collection, which combine some institutional features that are specific to similar flows.

Originally there was very little scientific research maintenance in this field, but since the second half of the 1970s, many advancements in science have been advancing the principle of gravity. The first regular effort to create the gravity equation from a model that estimated the object differentiation was Anderson (1979). Bergstrand has discussed the empirical evaluation of bilateral trade in a series of papers (1985, 1989) in which the measurement of gravity is combined with simple models of monopoly rivalry. *Helpman and Krugman (1985)* used a distinct commodity structure to explain the gravity concept, with rising returns to scale. Deardorff (1995) showed that the gravity equation has many models and conventional exchange theories can describe them. Anderson and Wincoop (2001) have finally established a model of operational seriousness aimed at improving the CES system for expenditure that can be easily calculated and that helps to address the so-called limit issue.

There is a large range of scientific applications in international trade literature that have led to improving gravity equation efficiency. Any of them contribute closer to our jobs. The econometric understanding of the gravity equation in the latest publications has been improved by Mátyás (1997) and (1998), Chen and Wall (1999), Breuss and Egger (1999), and Egger (2000). Secondly, the explanatory variables integrated in the analysis by adding new variables and, according to the general exchange gravity model, the number of exports between countries, Xij is the feature of the country 's incomes (GDPs); their population, among others, were Berstrand (1985), Helpman (1987), Wei (1996), Soloaga and Winches (1999), Limao and Venables (1999); and Bougheas et al (1999).

**The basic augment gravity model:**

$$X_{ij}=c+\beta_1 lnGDP_i+ \beta_2 InGDP_j+ \beta_3 InDist_{ij}+e_{ij}$$

in conformity with Gil-Pareja, Llorca-Vivero, Martínez-Serrano (2019), where *ln* denotes logarithm, ***i*** and ***j*** denote countries that have trading relationships. The variables below are: Xij are the bilateral export flows from country j to country j, GDPi, and GDPj reflect the country I and country j's gross domestic product, Distij is the gap between the country I to country j.

Withal, in this research, in addition from GDPs and Distance, we will use the following variables (which we will characterizein the following subsection): CONT is a dummy variable that equals zero if I and j have a boundary of the property, COMLANG is a dummy variable that is unitary if I and j have a common language.

The augmented gravity model of international trade equation can be written as:

$$X_{ij}=\beta_1 InGDP_i+ \beta_2 InGDP_j+ \beta_3 InDist_{ij}+ \beta_4 CONT_{ij}+ \beta_5 InCOMLANG_{ij}+\beta_6 Corrup_{ij}+ \beta_7 Difcorrup_{ij}+ \beta_8 DIFF_{ij}+ \beta_9 REER_{i+}REER_j+\lambda_t+u_{ijt}$$

where $\lambda_t$ are time dummies and $u_{ijt}$ is the standard classical error term (Gil-Pareja, Llorca-Vivero, Martínez-Serrano, 2019).

Below the descriptions of the variables are described:

**Income [GDP]:** Gross domestic product (GDP) is a nominal indicator of the total value of all the finished products and services generated for a specified period of time.

**Bilateral exports of oil [X]:** Bilateral exports are the products and services that are manufactured in one nation and bought by citizens in another.

**Income per capita differential [DIFF]:** This variable is described as the difference between the partner countries 'GDP per capita, added in order to detect a potential Linder effect. Bilateral exchange would be increasing, according to Linder's theorem, because the per capita GDPs of the exchanging countries are more comparable.

**Real effective exchange rate [REER]:** The real effective exchange rate (REER) is the weighted average of a country's currency compared to another global currency index or set.

The weights are calculated by contrasting the currency of a nation's relative trading balance to each region inside the measure.

**Corruption index [CORRUP]:** It is a country-pair corruption index (our interest variable). For the exporter, Corrupijt is the statistical calculation of the values of the related factors for abuse. That will provide us with an average amount of corruption that affects the same pair of countries. For the characteristics of the data in hand, we use the geometric mean because it is more suitable for CPI and CCI, since these indexes rate countries at the level of corruption. Hence, the geometric mean contributes less weight to the dramatic data values, Similarly with Gil-Pareja, Llorca-Vivero, Martínez-Serrano (2019).

**Difference of corruption index [DIFCORRUP]:** Analogously with Gil-Pareja, Llorca-Vivero, Martínez-Serrano (2019), it is an indicator of the distinction in the level of corruption in the country-pair. It is the total value to the exporter of the disparity of the corruption rankings. It shows us the "distance" between the pair of countries of rates of corruption. Horsewood and Voicu (2012) have found that trade is declining to the degree that the distinctions in this institutional characteristic are widening. We're going to check the finding with our study and different corruption interventions.

**Common border [CONT]:** This value shows the common border between the pair of countries, likewise with Gil-Pareja, Llorca-Vivero, Martínez-Serrano (2019).

Initially, combined Ordinary Least Squares determined the gravity equations. Since the 2000s, though, some important articles also outlined several related aspects that needed to be taken into consideration in calculating equations of gravity in order to prevent problems of misspecification issues.*Egger (2002)* points to the need to control certain causes of countries-pairs that effect their joint trade but are unchanged over time (unobservable bilateral heterogeneity). This is explained by including fixed state pair effects (CPFE) in the panel data set. Apart from this, the fixed effects of an incomprehensible pair are correctly controlled by the main informants of endogeneity *(Baier and Bergstrand, 2007, or Gil-Pareja, Llorca-Vivero, Martínez-Serrano, 2019).* It is indisputable that the effects of dynamic variables of the country-pair in the two-way fixed effects are reported in the distance, the common language, etc.

The most commonly used procedure used for regression analysis is called *The Ordinary leastsquares (OLS).* In statistics, ordinary least squares (OLS) are the variety oflinear least-squares method used to estimate unidentified parameters in a linear regression model. OLS selects the parameters of a linear function of a series of explanatory variables by the theory of the least-squares: to minimize the sum of the squares of the discrepancies between the observed dependent variable (values of the variable being measured) in the given dataset and those expected by the linear function.

If the classical weight estimate assumptions are fulfilled, the Ordinary Least Squares Estimator (OLSE) is the strongest linear regression process. If these premises are broken, the strict approaches produce more exact predictions when the OLSE is seriously negatively affected. In statistics, ordinary least squares (OLS) is a sort of linear least-squares approach used to approximate uncertain variables in a linear regression. OLS selects the parameters of a linear function of a series of explanatory variables by the theory of the least-squares: to reduce the sum of the squares of the variations between the observable dependent variable (values of the variable being measured) in the specified dataset and those expected by the linear feature.

Geometrically, this is defined as the sum of the square deviations between each data point in the collection and the corresponding point on the correlation sheet, parallel to the axis of the dependent variable – the smaller the variations, the more the model matches the results. From the theoretical regression model:

$$Y_i = \beta_0 + \beta_1 + X_i + \varepsilon_i$$

where Y is the value of dependent variable, $\beta_0$, is the intercept of the model, $X_i$ corresponds to the $i^{th}$ explanatory variable of the model (i= 1), and $\varepsilon$ is the random error with expectation 0.

It can be estimated regression equation

$$\hat{Y}_i = \hat{\beta}_0 + \hat{\beta}_1 X_i.$$

OLS is a technique that is used to obtain $\hat{\beta}_0$ and $\hat{\beta}_1$. The OLS method corresponds to minimizing the sum of square differences between the observed and predicted values. The OLS procedure minimizes

$$\sum_{i=1}^{n} e_i^2 = \sum_{i=1}^{n} (y_i - \hat{y}_i) = \sum_{i=1}^{n} (y_i - \hat{\beta}_0 - \hat{\beta}_1 - X_i)^2$$

with respect to $\hat{\beta}_0$ and $\hat{\beta}_1$. Solving the minimization problem results in the following expressions:

$$\hat{\beta}_1 = \frac{\sum_{i=1}^{n} (X_i - \bar{X})(y_i - \bar{y})}{\sum_{i=1}^{n} (X_i - \bar{X})^2} = \frac{\sum_{i=1}^{n} X_i y_i - n\tilde{y}\bar{X}}{\sum_{i=1}^{n} X_i^2 - n\bar{X}^2}$$

Beta equals to covariance between Y and X divided by the variance of X.

$$\hat{\beta}_0 = \tilde{y} - \hat{\beta}\tilde{X}_1$$

Different datasets will produce different values for $\hat{\beta}_0$ and $\hat{\beta}_1$

In order for OLS regression to work properly, your data should fit several assumptions (from the University of Oxford's list):

- The model should have linear parameters.
- The data should be a random sample from the population. In other words, the residuals should not be connected or correlated to each other in any way.
- The independent variables should not be strongly collinear.
- The residuals' expected value is zero.
- The residuals have homogeneous variance.
- The residuals follow a normal distribution.
- The independent variables have been measured accurately (if they aren't, small errors in measurement could result in huge errors for your OLS regression).

Santos Silva and Tenreyro (2006) propose the *Poisson quasi-maximum likelihood estimator* as a pragmatic solution to both problems. The Poisson regression model is defined in general terms by the discrete distribution. The Poisson estimator has many suitable properties for the usage of gravity models in practical policy analysis. First, the inclusion of defined results is reliable, and can be entering as dummy variables similar with basic OLS. The argument is an especially relevant one for gravity modeling since most theory-consistent models allow the exporters and importers to have defined effects.

In accordance with Shepherd, B., Doytchinova, H. S. & Kravchenko, A. (2019) the Poisson estimator is becoming increasingly common in the literature, but is not clear of divergent views. Applied researchers should be aware of some of the issues found with the Poisson

estimator and the resulting additional characteristics. On the one side, in place of Poisson, some researchers used alternative calculate data methods, such as the negative binomial model, under the basis that exchange data is prone to show over-dispersion (variance greater than mean). This strategy, however, is incorrect for two factors. Poisson is reliable as a pseudo-maximum estimator of likelihood no matter whether the results are currently spread. In terms of performance, the only change that might come from having over-dispersion would. Therefore, in order for the finding benefits to be true, the exact essence of the overdispersion will need to be understood because it is not ordinarily.

Second, the Poisson estimator obviously contains results in terms to which the measured commercial significance is zero. These results are removed from the OLS model as it does not define the logarithm of zero. However, they are quite normal in the exchange network, since not all countries deal with all suppliers for all goods (Haveman & Hummels, 2004). Although the problem has emerged primarily in the form of fair exchange to date, it is still applicable to the exchange of services. In recent scientific research, decreasing zero results in the manner OLS does theoretically contributes to sample selection bias, which has become a major problem. So Poisson's potential to make zero findings automatically and without applying anything to the simple model is extremely beneficial. While the effects of a model of dollar trade as the dependent variable would be different from those obtained as the dependent variable for trade in millions of dollars. This function of the negative binomial model in its normal environment of count data is not troublesome, however, is troubling in the case of gravity modeling. So in reality, practical researchers can oppose the negative binomial rule. A second resolution was released that other estimators may be superior to Poisson because a huge number of zeros is given by the observed exchange matrix.

Third, it is easy to view the Poisson model coefficients and follow the same pattern as for OLS. The coefficient of independent variables in logarithms can still be viewed as a simple elasticity, even when the Poisson Regression dependent variable is specified as exports at levels rather than logarithms. The solution to this problem, however, is similar to the previous one: Poisse is consistent irrespective of how the results are actually transmitted, which means that the zero and the non-zero measurements generated by the identical method of producing evidence. Recent tests (Santos Silva and Tenreyro, 2011 ) indicate in any case that Poisson performs very well even in datasets with large numbers of zeros.

Bringing both references, down there a good case with Poisson as the estimator of the workhorse pattern of gravity. From the point of view of integrated policy analysis, Poisson's favorable properties indicate that projections of policy impacts will typically be focused on findings from Poisson rather than OLS. Santos Silva and Tenreyro (2006) apply a benchmark to determine if the OLS estimator is acceptable, and another test to determine if Poisson or different estimators of pseudo-maximum probability is likely to be accurate. A thorough description of such measures, though, is out of the reach of the existing customer manual. In either case, Poisson tests should constantly be viewed for comparison objectives as a robustness check.

**Table 3. List and observations of the methodologies for scientific studies**

| *Year* | *Author* | *Research* | *Methodology* | *Major findings* |
|---|---|---|---|---|
| 2019 | Salvador Gil-Pareja, Rafael Llorca-Vivero, José Antonio Martínez-Serrano | Corruption and international trade: a comprehensive analysis with gravity | The gravity model | The findings show that corruption has a negative impact on trade with CCI. However, the use of SCI has a positive impact. Corruption adversely affects trade between countries with high and low incomes. |
| 2010 | Odularu | Impact of crude oil production on Nigeria economic growth | Ordinary Least square and Cobb-Douglas production function | Crude oil production led to industrial growth in Nigeria but was not dramatically enhancing economic efficiency. |
| 2007 | Akanni | Does Oil Exporting Countries grows as their earnings on oil rents increases | Ordinary least square (OLS) | The oil rent has a favorable association with economic development in oil exporting countries |

Table 3. List and observations of the methodologies for scientific studies (to be continued)

| | | | | |
|---|---|---|---|---|
| 2005 | Idowu | Linkage between oil exports<br>And Nigeria's economic development | Johansen Multivariate co-integration technique | Strong export-to-<br>GDP partnership |
| 1993,1995,1996 | Murphy Mandapaka Triole | Relationship between corruption and economic growth | OLS 2-Stage least square (Economic growth approach) | The adverse association between corruption and development could only be proved empirically by a few. |
| 1995, 1998<br>1999, 2000 | Tumovsky Jain Stapenhurst Hammond | Effectiveness of some proposed solutions to combat corruption | SWARM (Simulation approach) | Many demonstrated the strength of the partnership between corruption and growth impact trigger results. |
| 1991,1992,1995 | Andvig Laffont<br>Basu Mookherjee | Conditions necessary for corruption and those that is conducive to it. | One stage Game | This method offers some valuable perspectives on the concept of abuse. |

## 2.2 The measurement of corruption

The relation between the huge oil reserves and confusion, sometimes followed by internal pressure or wars, is a reality acknowledged by the scientists. In certain areas of the planet, oil reserves are closely related to the battles for dominance of oil production, and to the intervention of major powers in wars arising from oil searches. From all this comes the answer to the question, how does corruption occurs? In the pursuit of money and power,

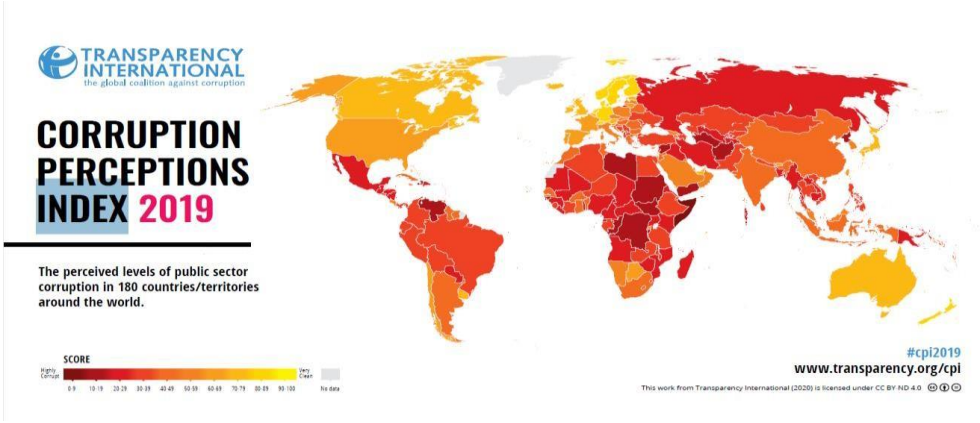
especially in countries where oil is produced, people are willing to break the law to get this power, thereby illegally obtaining these riches.

The part of the analysis of corruption presents a list of countries that will be used for the estimation of impact corruption on trade in oil exporting countries. Two indexes are commonly used to research corruption in countries: The Corruption Perception Index (CPI), and the Control of Corruption Index (CCI). These two steps will be applied below.

1. In accordance with Fouladi M., Goodarzi Farahani Y. and Setayesh H. (2014) the Corruption Perception Index (CPI) focuses on public sector corruption and describes corruption as the abuse of public authority for the gain of society. Surveys used to assemble the database contain queries about, for example, public official bribery. Index validity (CPI) is specific in various nations, which relies on the number of sources of evidence used to determine corruption rates. For each year, the calculation of the Corruption Perception Index is based on the details correlated with both the particular year and the year previous. The Index ranks countries and territories on a scale from 0 (highly corrupt) to 100 (very clean). It is necessary to remember that the relevant "grade" will be regarded in order to measure corruption in each country; the explanation is that a country's CPI-based "rating" the adjust simply as new countries join the index or certain countries can drop out.

2. The Regulation of Corruption Index (CCI) is an aggregate of multiple metrics that quantify the degree to which public authority is exerted for private benefit, covering both small and broad types of corruption, as well as elite and private-interest "capture" of governance. This index varies from -2.5 (for very low performance) to + 2.5 (for results excellent), similar with Fouladi M., Goodarzi Farahani Y. and Setayesh H. (2014).

**Figure 6. Corruption Perception Index 2019**




Source: www.transparency.org/cpi

**Table 4. Corruption Perceptions Index 2019 Global Scores**

| Country | CPI score 2019 | Rank | Standard error | Number of sources | Lower CI | Upper CI |
|---|---|---|---|---|---|---|
| Brazil | **35** | 106 | 4,06 | 8 | 28,34 | 41,66 |
| China | **41** | 80 | 2,10 | 8 | 37,55 | 44,45 |
| Iraq | **20** | 162 | 2,98 | 5 | 15,11 | 24,89 |
| Kazakhstan | **34** | 113 | 4,18 | 9 | 27,15 | 40,85 |
| Kuwait | **40** | 85 | 1,88 | 6 | 36,92 | 43,08 |
| Libya | **18** | 168 | 2,24 | 5 | 14,32 | 21,68 |
| Mexico | **29** | 130 | 1,73 | 9 | 26,17 | 31,83 |
| Russia | **28** | 137 | 2,48 | 9 | 23,94 | 32,06 |
| United Arab Emirates | **71** | 21 | 5,13 | 8 | 62,59 | 79,41 |
| Venezuela | **16** | 173 | 2,05 | 8 | 12,64 | 19,36 |

Source: www.transparency.org/cpi

Table 4 illustrates 10 countries with different score of corruption level. All these countries exporting oil and for our estimation of impact corruption on trade in oil exporting countries we choose countries with a different level, there are countries with a high level as Venezuela and Libya, and with a lower level ofcorruption as an example with United States Emirates.

## 2.3 The evolution of trade in oil exporting countries

Over the past decades, the oil industry has become a major factor in the development of the world economy and international relations. The situation on the world oil market is changing rapidly, and international problems caused by the struggle of various forces for the possession of this unique strategic commodity are constantly causing a wide resonance around the world. Analysis of the global oil market is essential for understanding the nature and direction of global development, both in general and for individual countries. Naturally, oil production has a significant impact on the development of the entire world economy. Large commodity oil production, being concentrated in a relatively small number of countries and mostly in the hands of large state organizations or private monopolies, is an important geostrategic factor in the world economy and politics, and large producing countries come together for a coordinated influence on the market.

Oil revenues are most important in the countries that are members of the Organization of petroleum exporting countries (they account for up to 60% of all export revenues). As we know, the Organization of petroleum exporting countries (OPEC) was formed in 1960. This organization, which became the commodity Association of independent sovereign oil-producing States, includes Algeria, Angola, Congo, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, and Venezuela. Later, this list was supplemented by other countries. The unofficial format of OPEC+ was formed in November 2016, due to the dissatisfaction of many oil-producing countries with prices on the world oil market. As of April 2020, the OPEC+ cartel includes 10 countries — Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, Sudan, and South Sudan (according to information of Wikipedia, the key producer and informal leader of the cartel is Russia, with 14% of world oil production). To regulate oil prices on the world market, OPEC has resorted to the cartel-specific method of quotas, i.e. setting an individual maximum oil production volume for each participating country.

**Table 5. Crude oil production by country**

| Countries | Last | Previous | Reference | Unit |
|---|---|---|---|---|
| Brazil | 3107 | 3090 | Dec/19 | BBL/D/1K |
| China | 3782 | 3820 | Dec/19 | BBL/D/1K |
| Iraq | 4500 | 4500 | Mar/20 | BBL/D/1K |
| Kazakhstan | 1949 | 1937 | Dec/19 | BBL/D/1K |
| Kuwait | 2901 | 2665 | Mar/20 | BBL/D/1K |
| Libya | 93 | 147 | Mar/20 | BBL/D/1K |
| Mexico | 1734 | 1726 | Dec/19 | BBL/D/1K |
| Russia | 10871 | 10853 | Dec/19 | BBL/D/1K |
| United Arab Emirates | 3526 | 2990 | Mar/20 | BBL/D/1K |
| Venezuela | 718 | 865 | Mar/20 | BBL/D/1K |

Source: tradingeconomics.com

Table 5 provides values for Crude Oil Production reported in observing 10 countries. The table has current values for Crude Oil Production, previous releases, historical highs and record lows.

**Table 6. GDP per capita by country in 2018**

| Countries | Last | Previous | Reference | Unit |
|---|---|---|---|---|
| Brazil | 11026 | 10990 | Dec/18 | USD |
| China | 7755 | 7308 | Dec/18 | USD |
| Iraq | 5511 | 5605 | Dec/18 | US |
| Kazakhstan | 11166 | 10868 | Dec/18 | USD |

**Table 6. GDP per capita by country in 2018 (to be continued)**

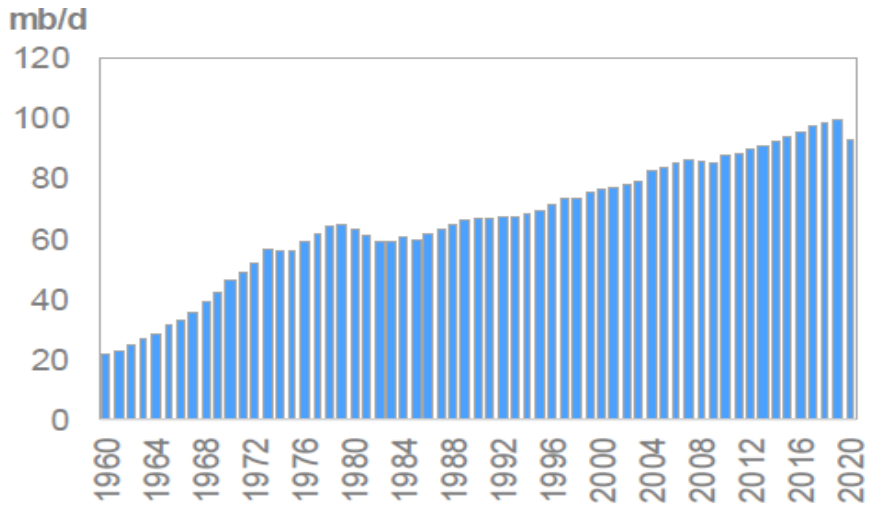
| | | | | |
|---|---|---|---|---|
| Kuwait | 33538 | 33790 | Dec/18 | USD |
| Libya | 7529 | 7086 | Dec/18 | USD |
| Mexico | 10385 | 10298 | Dec/18 | USD |
| Russia | 11729 | 11470 | Dec/18 | USD |
| United Arab Emirates | 40782 | 40819 | Dec/18 | USD |
| Venezuela | 16054 | 12457 | Dec/18 | USD |

Source: tradingeconomics.com

Table 6 presents data of Gross Domestic Product, which allows us to understand and analyze an economic condition of the chosen for observing 10 countries. As we can see from the table the highest GDP per capita in Venezuela and the lowest in Iraq. The table has current values for GDP per capita, previous releases, historical highs and record lows, release frequency, reported unit.

According to the information provided by OPEC the global economic development and demographic expansion have fueled a precipitous increase in oil demand for decades, adding a cumulative 75 mb/d since the 1960s. That said, oil demand has declined on an annual basis on different occasions, most recently in 2008-09. Previously, oil demand recorded y-o-y annual declines in the early 1980s for nearly four consecutive years with a cumulative drop of around 6 mb/d. Those declines were a response to slowing economic activity in industrial countries owing to the oil crisis of the 1970s, and the energy conservation encouraged by relatively high retail fuel prices.

**Figure 7. Total oil demand in the world since 1960 to 2020**




Source: OPEC (Organization of the Petroleum Exporting Countries)

The current global situation, driven by the onset of COVID-19 at the beginning of the year in China and elsewhere in the world by March 2020, appears to represent a perfect storm of oil demand destruction. Restrictions on mobility almost everywhere have constrained transportation fuel demand in the current year. For now, oil demand is projected to return to growth in 2021

An unbalanced energy market, primarily oil, is a major threat to the global economy. The lack of clarity on oil prices negatively affects economic development plans. It is clear that exorbitant oil prices, as well as very low ones, are unprofitable for both producers and consumers. It is important to understand that oil prices serve as a benchmark for pricing of other energy, and influence economic and political processes that determine the stock price of oil companies, the speed of their economic growth and the level inflation in the countries – importers of oil, and intensity of the processes of centralization and concentration of production.

## 2.4 Research hypothesis

Based on the literature review that was presented above, we have suggested the following hypotheses:

**Hypothesis 1**. *High level of corruption in oil-exporting countries, can affect economic growth and bilateral trade.* The impact of corruption on a country's economic growth is directly related to trade relations between countries. To support trade relations, investments are needed, which may flow out of the state budget during the development of corruption in the field of oil exports.

**Hypothesis 2.** *The high level of corruption in the oil exporting countries may reduce the effectiveness of international trade.* If corruption occurs in the oil exporting region, the level of exports may decrease. This may be due to a number of reasons: increasing prices in order to increase revenue, but not taking into account the prices of competitors. In this case, the buyer can enter into an agreement with another country. The second reason may be a desire to enter into a contract illegally. The buyer's country will refuse in this case based on the fact that it will be illegal.

**Hypothesis 3**. . Positive influence of the real effective exchange rate on the development of international trade in the oil sector. This hypothesis considers the possibility of the impact of the real effective exchange rate on the development of international trade to the positive side.

Following the above hypotheses, an econometric analysis will be performed to test these hypotheses using the gravitational model, OLS, and PPML for further analysis of the obtained data. All the results obtained in this work concerning hypotheses will be presented in the next part of the study

# III. RESULTS AND DISCUSSION

In this section, we will provide information about the results of the assessment. The collected data, which were analyzed and conducted a number of studies, will show us the results of our assumptions and hypotheses. This section provides data from the EViews program for estimation and calculation of the gravitational model. To analyze the impact of corruption on trade in oil exporting countries, was done to work with a selected list of ten countries. In our case, we will check the main variables as $CORRUP_{ij}$ and $Difcorrup_{ij}$, and also other variables as well as the remaining values between Kazakhstan and the other nine selected countries.

## 3.1. Results

The dataset consists from the annual data for Real GDP, Real Effective Exchange Rate, Bilateral exports, Income per capita differential (DIFF), Corruption index (CORRUP), Difcorrup, Common border (CONT), Distance between i and j countries, Trade in 10 (Kazakhstan, Russian, China, Mexico, Venezuela, Libya, United Arab Emirates, Kuwait, Iraq, Brazil) oil exporting countries for the period of 2000-2018. Top oil exporting countries were selected based on the market share in the world market. The data description and sources are described in the table below.

**Table 7. The data description and sources**

| № | Variable name | Description of the variable | Expected signs | Source |
|---|---|---|---|---|
| 1 | Bilateral exports ($X_{ij}$) | Bilateral exports in current USD | | Global Economic Data, Indicators, Charts& Forecasts |
| 2 | GDP | GDP of the countries i and jin current USD | Positive/ Negative | World Bank |
| 3 | REER | Real Effective Exchange Rate based on CPI | Positive/ Negative | Brent UK |
| 4 | DIST | Distance between i and j countries | Negative | World Bank |

Table 7. The data description and sources (to be continued)

| | | | | |
|---|---|---|---|---|
| 5 | $CORRUP_{ij}$ | Index of corruption | Negative | World Bank |
| 6 | $DIFCORRUP_{ij}$ | Difference between Cori and $cor_j$ | Positive | World Bank |
| 7 | $DIFF_{ij}$ | Trade (% of GDP) | Positive | World Bank |
| 8 | $CONT_{ij}$ | common land border | Positive | Dummy variable |
| 9 | $COMLANG_{ij}$ | common language between countries | Positive | Dummy variable |

The product of GDP of Kazakhstan and 9 countries in time t used as a measure of economic size. This variable is expected to be positively and significantly related to trade. Gross domestic product of 9 countries and Kazakhstan are obtained from the World Bank, both of them are in US current dollars and converted into constant US price of 2000 using the GDP deflator given by WB.

Empirical studies found that exchange rates are important in the interpretation of trade differences between participating states in addition to the gravity equation (Bergstand,1985 and Dell Ariccia, 1999). The exchange rate is also included in the model as an illustrating variable. The nominal exchange rate shall be calculated by an annual average of ten countries per dollar per national currency unit, divided by one Kazakhstan National Monetary Unit per dollar per annum. Data of the exchange rate for both 9 countries and Kazakhstan are obtained from the World Bank and the Global Economic Data, Indicators, Charts& Forecasts. Source: [https://www.ceicdata.com/datapage/en/indicator/real-effective-exchange-rate].

The effect on bilateral trade between Kazakhstan and nine countries of real exchange rate variables is likely to be negative. Currency appreciation in Kazakhstan reflects a rise in the actual exchange rate, which would result in costly exports and cheaper imports. The former effects of Kazakhstan 's trade relations with nine countries seem reasonable to presume, or the increase of the real exchange rate leads to a decrease in bilateral trade. This is because Kazakhstan has a long-term surplus with nine countries and most exports from

Kazakhstan are labor-intensive, while imports are capital-intensive, so exports are most vulnerable to market price fluctuations.

The distance is calculated in kilometers between Nursultan capital city and the capital of the other countries as the transport costs proxy between Kazakhstan and 9 countries. Data about distance is taken from a wide circle between capitals, where distance as the minimum distance along the earth's surface is measured. It is predicted that this variable would have a detrimental impact on trade with the increased costs of transport over distances.

We are employing 2 major corruption measures for this measure of general in the study: The Corruption Perception Index (CORRUPij) as the indicator of corruption and Difcorrupij as the absolute value of the difference between the export and import indexes. This gives us the "distance" between the two countries in corruption. In this regard, Horsewood and Voicu (2012) find that the trade in this institutional characteristic increases as far as the differences are reduced. With our sample and various corruption measures, we will test this result. The difference between GDP per capita i and j in the region, as determined by our chart, is by capital differential income (DIFF).

The contiguity (CONTij) is a variable of the dummy that takes 0 in case the associates have a common border, and 1 differently. The common language (COMLANGij) variable is a binary variable that takes value 1 when common languages exist in countries and 0. Bilateral export estimates from Kazakhstan to 9 countries are presented in Table 8.

**Table 8. Results using OLS (Ordinary Least Squares)**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.221395 | 6.881101 | 1.049454 | 0.2956 |
| $LOG(GDP_i)$ | 1.061292 | 0.261024 | 4.065876 | 0.0001 |
| $LOG(GDP_j)$ | 0.169627 | 0.118837 | 1.427398 | 0.1554 |
| $REER_i$ | 0.001266 | 0.017995 | 0.070354 | 0.9440 |
| $REER_j$ | -0.008691 | 0.007256 | -1.197759 | 0.2328 |
| $LOG(DIST_{ij})$ | -0.181316 | 0.802506 | -0.225938 | 0.8215 |
| $DIFF_{ij}$ | 4.87E-05 | 2.92E-05 | 1.666755 | 0.0975 |
| $DIFCORRUP_{ij}$ | -0.071355 | 0.035334 | -2.019466 | 0.0451 |
| $CORRUP_{ij}$ | 0.086021 | 0.074404 | 1.156142 | 0.2493 |
| $CONT_{ij}$ | -8.133724 | 1.043050 | -7.798020 | 0.0000 |
| $COMLANG_{ij}$ | 2.181459 | 0.657148 | 3.319587 | 0.0011 |
| R-squared | 0.742587 | Mean dependent var | | 8.295497 |
| Adjusted R-squared | 0.726499 | S.D. dependent var | | 4.802234 |
| S.E. of regression | 2.511440 | Akaike info criterion | | 4.741755 |
| Sum squared resid | 1009.173 | Schwarz criterion | | 4.943850 |
| Log likelihood | -394.4201 | F-statistic | | 46.15696 |
| Durbin-Watson stat | 0.857771 | Prob(F-statistic) | | 0.000000 |

Notes: Sample period: 2000-2018. Dependent variable: log of bilateral exports (C).

Tkr = (0,05; n-k-1) = (0,05; 159) = 1,66→5%

$Log(GDP_i)$, $DIFF_{ij}$, $DIFCORRUP_{ij}$, $CONT_{ij}$, $COMLANG_{ij}$ are significant at 5%.

The results for the estimations of the gravity equation of corruption considered are in the Table 8. As normal, about 74% of the variability in bilateral trade flows is well explained

by the OLS calculation for the gravity equation. Trade flows are projected to increase with national revenues and decrease with distance. The remaining variables with small exceptions depending on the sample of the increased gravitational equation are, in General, sensible and have no significant coefficients. The OLS method shows that trade equations are accurate, approximate coefficients with almost all the anticipated signs.

The regression coefficient of $GDP_i$ (Kazakhstan) is 1.061 with positive value. Thus, it can be concluded that the $GDP_i$ variable has a significant effect on Kazakhstan's export value to 9 destination countries. While $GDP_j$ variable (9 importing countries) has also positive coefficient 0.169 and partially has a probability value of 1.43 (1.43 < 1.66), thus $GDP_j$ has no significant effect on Kazakhstan's export value to 9 destination countries.

As a price competitiveness variable, the real effective exchange rates in the i country have a positive effect on trade flows. The exchange rate of the exporting country indicates that the exporting country's weakening of its currency has an important and positive effect on its exports. REERj has a negative sign on the other hand.

The distance as a transportation cost proxy is negative and not significant at a level of 5 percent. The contij also provides a negative and meaningful coefficient that shows the presence of common borders. Common language is a positive but not important that suggests that countries may increase trade flows while they have different languages.

With respect to corruption variables, both export and import trade flows have a positive impact on the interpretation of corruption indexes. The exporting country's decrease in corruption boosts trade. A decrease in corruption on the part of the importer would lead to an increase in the volume of trade.

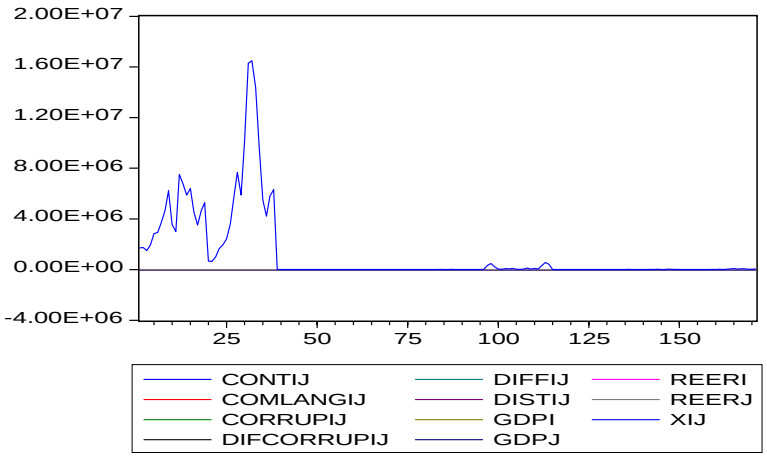



**Figure 8 – Time effects of trade between Kazakhstan and other 9 countries**

Figure 9 plots the time effects of bilateral trade between Kazakhstan and the other countries, these effects are all individually significant. Kazakhstan's trade with other 9 countries has increased substantially from 2000 to 2018. After 2000 until recently the bilateral trade, however, has a tendency to decrease. The recession can be explained from the world crisis which occurred in 2008 and 2014 and it should be noted that the OLS method has coefficients that are not significant this is due to the fact that many variables were included in the model and then collinearity may appear between the variables, also in the second method PPML z statistical has too large numbers this also became suspicious. Now let's try to eliminate some variables in order to correct our model. To do this, create a correlation table that shows exactly the variables that need to be removed.

**Table 9. Correlation matrix**

| | $COMLANG_{ij}$ | $CONT_{ij}$ | $CORRUP_{ij}$ | $DIFCORRUP_{ij}$ | $DIFF_{ij}$ | $DIST_{ij}$ | $GDP_i$ | $GDP_j$ | $REER_i$ | $REER_j$ | $X_{ij}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $COMLANG_{ij}$ | *1* | -0.377 | 0.394 | -0.400 | -0.332 | -0.590 | 3.028 | -0.163 | -1.932 | 0.490 | 0.295 |
| $CONT_{ij}$ | -0.377 | *1* | 0.052 | -0.092 | -0.253 | 0.608 | 3.469 | 0.130 | -3.287 | -0.162 | -0.764 |
| $CORRUP_{ij}$ | 0.394 | 0.052 | *1* | **-0.890** | -0.691 | -0.034 | 0.105 | 0.115 | -0.004 | 0.489 | 0.040 |
| $DIFCORRUP_{ij}$ | -0.400 | -0.092 | **-0.890** | *1* | **0.757** | 0.054 | 0.063 | -0.155 | -0.016 | -0.444 | 0.016 |
| $DIFF_{ij}$ | -0.332 | -0.253 | -0.691 | **0.757** | *1* | 0.219 | 0.067 | -0.110 | 0.028 | -0.290 | 0.221 |
| $DIST_{ij}$ | -0.590 | 0.608 | -0.034 | 0.054 | 0.219 | *1* | -1.344 | 0.125 | 6.152 | -0.163 | -0.453 |
| $GDP_i$ | 3.028 | 3.469 | 0.105 | 0.063 | 0.067 | -1.344 | *1* | -0.117 | 0.348 | 0.161 | 0.226 |
| $GDP_j$ | -0.163 | 0.130 | 0.115 | -0.155 | -0.110 | 0.125 | -0.117 | *1* | 0.004 | 0.244 | -0.187 |
| $REER_i$ | -1.932 | -3.287 | -0.004 | -0.016 | 0.028 | 6.152 | 0.348 | 0.004 | *1* | 0.079 | 0.086 |
| $REER_j$ | 0.490 | -0.162 | 0.489 | -0.444 | -0.290 | -0.163 | 0.161 | 0.244 | 0.079 | *1* | 0.211 |
| $X_{ij}$ | 0.295 | -0.764 | 0.040 | 0.016 | 0.221 | -0.453 | 0.226 | -0.187 | 0.086 | 0.211 | *1* |

A correlation matrix is a table showing correlation coefficients between variables. Each cell in the table shows the correlation between two variables. A correlation matrix is used to summarize data, as an input into a more advanced analysis, and as a diagnostic for advanced analyzes, indirect signs of multicollinearity are high standard errors in model parameter estimates, small t-statistics (meaning that coefficients are insignificant), and incorrect marks of estimates, even though the model as a whole is recognized as statistically significant (a large value of F-statistics). Multicollinearity can also be indicated by a strong change in parameter estimates from adding (or deleting) sample data (if the requirements for sufficient sample uniformity are met). To detect multicollinearity of factors, the correlation matrix of factors can be analyzed directly. The presence of large modulus values (above 0.7-0.8) of the pair correlation coefficients indicates possible problems with the quality of the obtained estimates.

There is a collinearity between the variables $DIFCORRUP_{ij}$ and $CORRUP_{ij}$-0.890 > 0.7. also, $DIFCORRUP_{ij}$ and $DIFF_{ij}$ 0.757>0.7. An ongoing debate about estimating techniques has been generated by the expanded use of the gravity models to predict

international commercial flows. In particular, there is controversy about zero-commercial and heterogeneous residues. Both of these problems also concern models of gravity used to simulate other behavior that echo gravitational interactions in social sciences.

Next, we consider heteroscedasticity in the OLS model using the white test that presented in Annex 2. As can be seen from the table, our model has a heteroscedastic since, test statistic is significant, P value< 5%.

In the past several years Poisson has gained more popularity in addressing these estimate problems, together with pseudo-maximum likelihood methods. This method is robust for multiple trends, and it is also a reasonable way to resolve the zero question in the data on trade flows. We argue that the estimation by PPML of model parameters leads to clear but partial estimations of parameters when the spatial correlation between flows of origin and purpose is ignored. We suggest separate spatial filtration variants of the Poisson gravity model along with the pseudo maximum likelihood calculation to resolve this estimation.

**Table 10. Estimation Results of PPML (Poisson Pseudo Maximum Likelihood)**

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| Constant | 5.323852 | 0.009538 | 558.1453 | 0.0000 |
| $REER_j$ | -0.008811 | 9.49E-06 | -928.3030 | 0.0000 |
| $REER_i$ | 0.000339 | 6.80E-06 | 49.87126 | 0.0000 |
| $LOG(GDP_j)$ | 0.088785 | 5.65E-05 | 1571.573 | 0.0000 |
| $LOG(GDP_i)$ | 1.074727 | 0.000267 | 4025.609 | 0.0000 |
| $LOG(DIST_{ij})$ | 0.269936 | 0.001035 | 260.8430 | 0.0000 |
| $DIFF_{ij}$ | 1.24E-05 | 4.02E-08 | 308.0238 | 0.0000 |
| $DIFCORRUP_{ij}$ | -0.036368 | 1.94E-05 | -1878.645 | 0.0000 |
| $CORRUP_{ij}$ | -0.016550 | 3.74E-05 | -442.2068 | 0.0000 |
| $CONT_{ij}$ | -5.421505 | 0.001552 | -3492.730 | 0.0000 |
| $COMLANG_{ij}$ | 3.803913 | 0.004246 | 895.9735 | 0.0000 |
| R-squared | 0.921932 | Mean dependent var | | 1180881. |
| Adjusted R-squared | 0.917053 | S.D. dependent var | | 2831590. |

Table 10. Estimation Results of PPML (Poisson Pseudo Maximum Likelihood), to be continued

| | | | |
|---|---|---|---|
| S.E. of regression | 815514.2 | Akaike info criterion | 144086.0 |
| Sum squared resid | 1.06E+14 | Schwarz criterion | 144086.2 |
| Log likelihood | -12319346 | Hannan-Quinn criter. | 144086.1 |
| Restr. log likelihood | -3.36E+08 | Avg. log likelihood | -72042.96 |
| LR statistic (10 df) | 6.48E+08 | LR index (Pseudo-R2) | 0.963352 |
| Probability(LR stat) | 0.000000 | | |

As for the second method, it is more plausible, that is, we will get the values of the model parameters that make the data "closer" to the real one. The results of Table 10 are therefore our preferred results. As far as we know, this is the first paper, which estimates both the effects on trade of corruption in the light of all the linked sources of possible bias and uses the corruption index. The Poisson estimator is increasingly popular in literature, but it is not free of differences. Applied researchers need to consider some of the issues found with respect to the Poisson estimator, and the resulting additional characteristics.

The GDP of Kazakhstan and the other countries in this model is also very low, but it is positive and significant. As in the first model, the distance has a negative sign. $Difcorrup_{ij}$ and the corruption index also have a negative sign. Income per capital differential (DIFF) is positive and statistically significant. The dummy variables Contij and Comlangij are positive and negative.

Therefore, we have to be able to understand why the difference in estimates is as high as they are, how heteroscedasticity is patterned, and why an especially big prediction for this particular sample will occur. Remember that in the special case where OLS error term (ijt) is homoscedastic, OLS estimates are consistent. The use of what Tukey (1977) calls a "transparent system" is a helpful way of visualizing how far away from the data is from fulfilling this statement.

**Table 11. Results using OLS and PPML (Poisson Pseudo Maximum Likelihood) from 2005 to 2018**

| Variables | OLS | St. error | PPML | St. error |
|---|---|---|---|---|
| Log(C ($X_{ij}$)) | -2.504 | 7.702 | 12.071 | 0.004 |
| $COMLANG_{ij}$ | 3.348 | 0.725 | 3.412 | 0.004 |
| $CONT_{ij}$ | -8.313 | 1.172 | -4.915 | 0.001 |
| $CORRUP_{ij}$ | 0.061 | 0.085 | -0.017 | 3.520 |
| $DIFCORRUP_{ij}$ | -0.096 | 0.041 | -0.043 | 1.810 |
| $DIFF_{ij}$ | 7.190 | 2.820 | 3.260 | 3.340 |
| Log($DIST_{ij}$) | 0.656 | 0.840 | -1.450 | 1.940 |
| Log($GDP_i$) | 1.988 | 0.600 | 0.007 | 2.310 |
| Log($GDP_j$) | 0.101 | 0.130 | 0.0003 | 4.860 |
| $REER_i$ | -0.006 | 0.017 | -0.002 | 7.210 |
| $REER_j$ | -0.020 | 0.007 | -0.003 | 8.330 |
| Observations | 117 | | 117 | |
| $R^2$ | 0.78 | | 0.91 | |
| Notes: Sample period: 2005-2018. | | | | |

Calculations for the 2005-2018 sample reports traditional results. For example, GDP positively and significantly affects trade flows. $REER_i$ and $REER_j$ still negatively and significantly affect export flows. For $Diff_{ij}$ it has positive and significant coefficients for both exporting and importing countries. The $GDP_i$ has a positive and significant effect on exports for the exporting country, while it has a negative and non-significant effect on the importer side. Corruption remains a negative factor for trade growth. For example, the control of corruption as a proxy for good governance positively and significantly affects trade flows.

Evaluations of GDP and effective exchange rates for the 10 countries from 2005-2018 demonstrate the same impact. However, in explaining trade flows, the two dummy variables (contiguity, the common language) are very important. Contij harms bilateral trade. These findings indicate that there will be more sharing between two countries with shared borders. On the other hand, the common languages are positive in promoting intra-regional

trade. As far as corruption is concerned, our findings show the good governance of regional trade through an anti-corruption institutional framework. We should note in this regard that the negative effect of corruption on international trade is more important for 10 countries and in regard to our findings in Tables, we accept the null hypotheses of HI, HII. The results of accept/reject of the research hypotheses are shown in Table 12.

**Table 12. Results of the checked hypotheses of the final master thesis**

| Hypotheses | | | Variable | Predicted sign | Estimated sign | Result |
|---|---|---|---|---|---|---|
| $H_1$ | $H_0$ | The high level of corruption in oil exporting countries which can affect economic growth and bilateral trade | $CORRUP_{ij}$ | Negative | In OLS – positive<br>In PPML - negative | Accept $H_0$ |
| | $H_1$ | The high level of corruption in oil exporting countries which can not affect economic growth and bilateral trade | $CORRUP_{ij}$ | Negative | In OLS – positive<br>In PPML - negative | Accept $H_0$ |
| $H_2$ | $H_0$ | The high level of corruption in the oil exporting countries may reduce the effectiveness of international trade | $CORRUP_{ij}$ | Negative | In OLS – positive<br>In PPML - negative | Accept $H_0$ |
| | $H_1$ | The high level of corruption in the oil exporting countries may not reduce the effectiveness of international trade | $CORRUP_{ij}$ | Negative | In OLS – positive<br>In PPML - negative | Accept $H_0$ |
| $H_3$ | $H_0$ | Positive influence of the real effective exchange rate on the development of international trade in the oil sector. | REER | Positive | Negative | Accept $H_1$ |
| | $H_1$ | Negative influence of the real effective exchange rate on the development of international trade in the oil sector. | REER | Positive | Negative | Accept $H_1$ |

## 3.2. Discussion of results

The result of this research supports previous researches, showing that the corruption of exporting and importing countries has a significant and negative effect on export (Dutt and Traca, 2007), (Anderson and Marocouiller, 2000). The findings in this research are very different and show that there is no significant influence on the export volume in Indonesia on the corruption of importing countries. Since Kazakhstan has very low rates of corruption in nine export destinations. Another researches on corruption and international trade show that the corruption perception index of exporting and importing countries has a positive relationship with the export values of several European countries (Voicu and Horsewood, 2006, 2011, 2012). Voicu and Horsewood (2006, 2011, 2012) also show that the effect of corruption is more perceived by exporting countries than importing countries. According to this report, Kazakhstan as an exporting country is more affected by corruption. Thus, the regulatory structure and corporate ethics must be strengthened if a nation establishes trade with other countries.

Research indicates that Kazakhstan's GDP and Kazakhstan's export to 9 destination countries has a good relationship. Increased Kazakhstan GDP triggered increased exports to nine destination countries (the Growth led Export Hypothesis). According to the analysis above exports of products and services were growing. It can be explained that an increase in economic income will promote an increase in production factors in a country. An increased availability of goods and services will result. Increased output factors. Increased supply not only for domestic demand, but also for export products is occurring in goods and services. The rapid technology and innovation transfer in domestic industries will, according to Findlay (1984), encourage an expanded economy-based export production.

Many models are based on the findings of significant literature contributions and are proposing refining of established estimators by means of the SST database (2006), the main contribution in the literature to heteroscedastic, the prevalence of zero commercial values, which is crucial for validating our results and our comparative study. The data comprises bilateral export flows cross-sectional in 1990 from 136 countries. A detailed overview of data can be found in SST (2006), including the list of countries, versions, sources, etc. The 'real GDP per capita,' 'population,' 'location,' 'width.' The explication variables include the 'bilateral exports,' while the 'preferential trade agreements' are the explanatory variables. The

explaining variables often include a collection of dumb variables designed to catch 'contiguity', 'common language' and 'colonial relations' and 'water access.'

It should be noted that our findings are completely consistent with the results of SST (2006). In part, our estimations are equal to the entire PPML sample and the sub-sample. The SST (2006) findings are also true. Probably, the PPML estimator better handles the heteroscedasticity relative to other estimators. The PPML estimates further indicate, as compared to higher values than other models (e.g. OLS GDP average elasticities are above 90 percent and around 80 percent for export' s GDP and importer's GDP), that the importer's and exporter's GDP describe just above 70 percent of trade between countries. The SST findings (1966) also comply with estimates of other variables, such as size, remoteness, and access to water and preferential trade arrangements, which are the same findings. It means that, with the heteroscedasticity and zero trade values, the PPML calculations vary from other models.

According to Rose (2005), the gravity model is estimated for three different data sets. The first one is a sample of 180 countries over the period from 1980 to 2000. The second dataset consists of a sample of 65 countries similar to Márquez, Martínez, and Suárez (2007), with data every five years over the period from 1980 to 1999. Finally, a third sample of 47 countries accordingly to Martínez-Zarzoso et al. (2009) is used, covering the period from 1980 to 1999. In the three studies, the proportion of zero export values is 13, 15, and 23%. The modern model of seriousness is considered as well as the technically justified model of gravity with multilateral terms of resistance as exporter and importer dummy variables (Anderson & Wincoop, 2003).

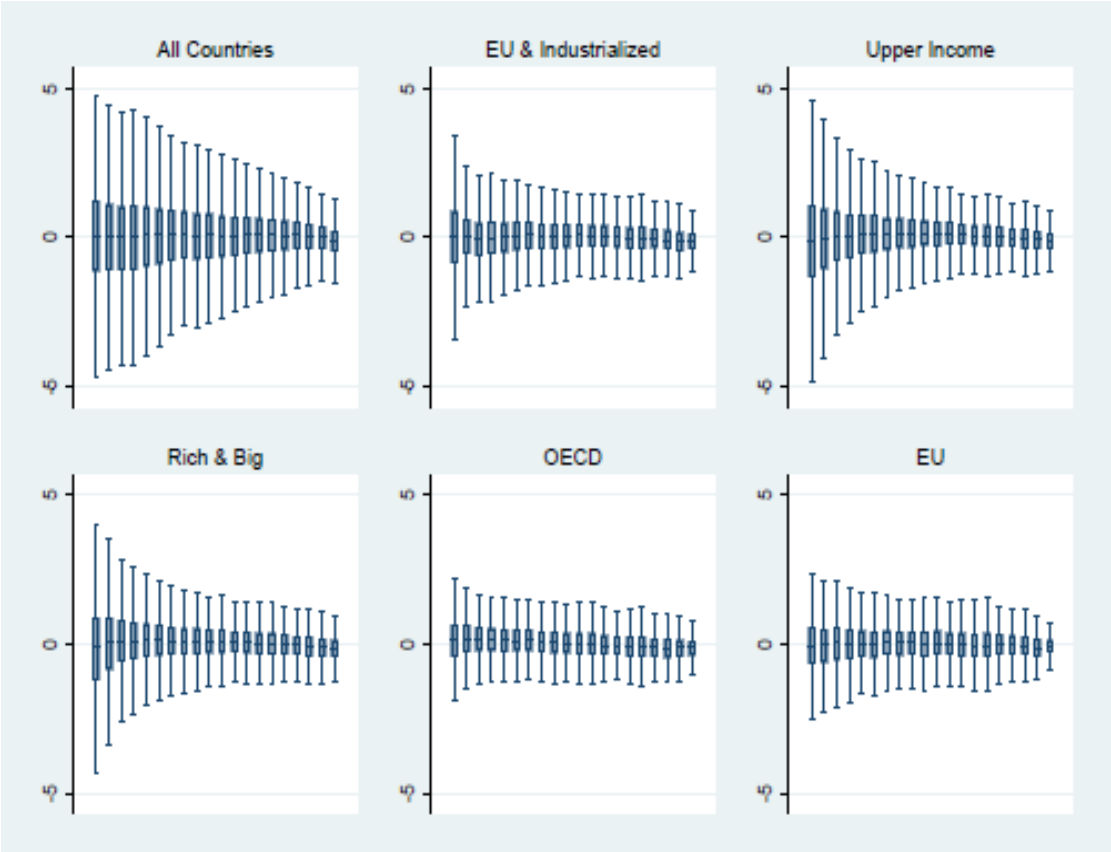
The distribution of all three samples of the dependent variable, total exports, shows right skewness, as no exports are negative and some pairs of countries do not trade with each other. For the first study in 1990, summary statistics are mean = 1.82e+08, variance = 3.29e+18, skewness = 28.59645, and kurtosis = 1155,022. The purpose of normalizing the distribution is to take natural logarithms. The statistics for log exports shall be equal in summary terms to mean=14.17866; variance=16.51199; skewness= -.8381542 and kurtosis=0.054987. Although the transition closer to the normal distribution, the standard test still rejects the presumption of normality.

We argue in this chapter that standard practice for logging the gravity model on a linear basis and for calculating the least-square parameters of interest is not sufficient. The

fundamental issue with this approach is that log-linearization leads to conflicting estimates in the presence of heteroscedasticity. One additional issue is that log-linearization is incompatible with zero data flows, and lack of zero trade flows results in a skewed way as nulls are not usually distributed randomly.

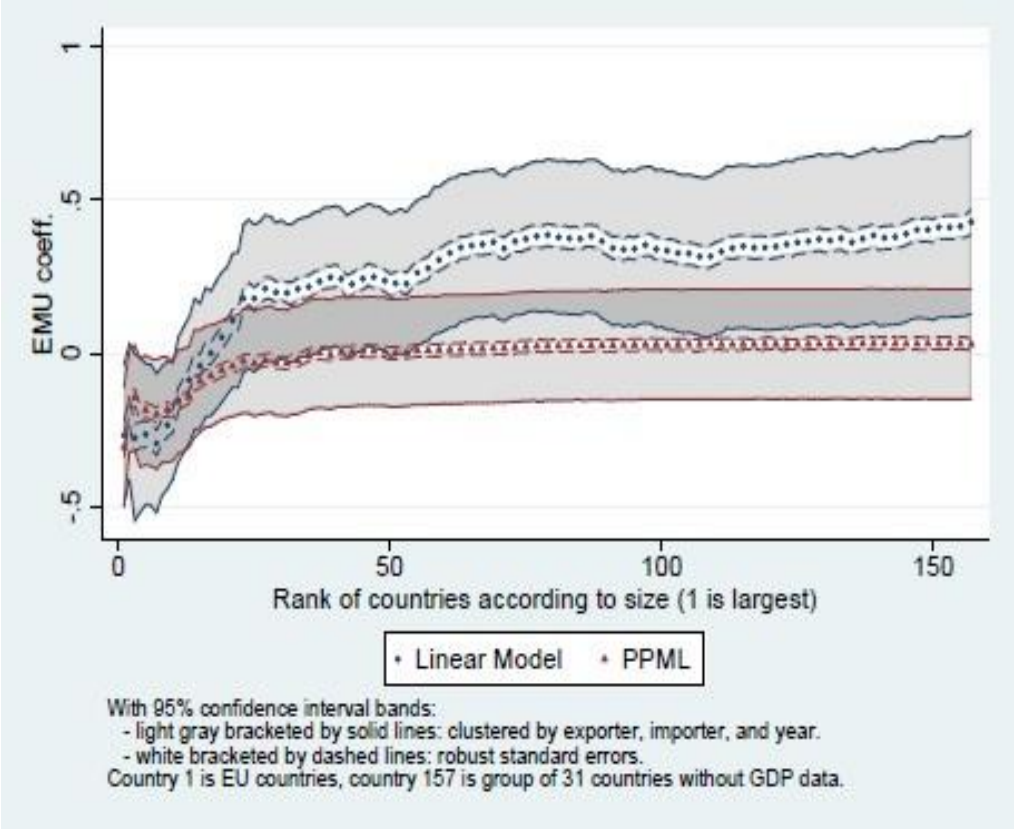
Therefore, we have to be able to understand why the difference in estimates is as high as they are, how heteroscedasticity is patterned, and why an especially big prediction for this particular sample will occur. Recall that in the special cases where the OLs error term (ijt) is homoscedastic OLS estimates are consistent. A useful way to visualize how far from the data this is to be met is by using what calls a "wandering scheme" (Tukey, 1977). In order to produce this scheme — which is illustrated in Figure 8—for each bin collecting observations of similar trade values, we first group all residuals from the calculation into 20 bins of equal size. We then group these containers from the smallest to the largest forecast value and create modified box plots to summarize the error terms within each container. The residuals from our key OLS specification (i.e. column 2 in Table 11) are obviously not homoscedastic, as the above-left panel in figure 8 shows — in the visual acquisition of our previous park test results. Specifically, the boxes for the first and third quartiles of each sample (reflecting the adjoining values) and the associated whiskers (reflecting the adjacent values) expand from left to right gradually, as observations with greater expected trade value considerations, suggesting that the variance of such waste is inversely linked to the contingent imply across the whole sample. This does not mean that, for larger trade flows, the gaps between observed flows and equipped ones are not smaller. Instead, the percentage gap is increasing.

**Figure 9 - Heteroscedasticity visualization in the data: residuals of OLS vs. Predicted log trade. Flows, Binned by Size.**




In order to explore in more detail how the differences between linear and PPML estimates evolve with the composition of the reference group, Figure 9plots estimates for both the linear and PPML models, starting with the EU as a whole and then adding one country at a time to GDP in 2013. These estimates show that the addition of more and more (smaller) countries leads to an ever-increasing OLS estimate — even for the addition of the world's smallest economies — while the PPML estimates stabilize after the inclusion of around 40 additional countries. This differential is by no means surprising based on the previous discussion: by including smaller and smaller countries in the sample, we tend to heteroscedasticity the data and thus increase the partiality in the OLS estimate.

**Figure 10 – The results of the EMU Coefficient Estimates Comparison Group of non-EMU countries**




Nevertheless, we notice that, in addition to the survey, the PPML and OLS figures shown in Figure 9 are typically affected in the same way. The estimates for PPML and OLS show both that trade between EMU members has decreased, relative to trade between them with the rest of the European Union and with the six largest non-EU economies (US, China, Japan, Brazil, and India), which together make up more than two-thirds of non-EMU 's GDP worldwide. However, intra-EMU exchange seems to have expanded in comparison to smaller allies, beginning with the seventh-largest non-EMU economy in Canada. The optimistic and important overall OLS estimation of the EMU impact we find tends to be strongly affected by the obvious decline in trade within the sample between the EMU and several smaller, non-EMU countries as opposed to intra-EMU trades in the light of these trends. Given that PPML does naturally reduce the number of small reference groups and that this pattern is not found for the most important external partners of the EMU, this data feature could explain some of the differences between the PPML and OLS EMU estimates.

The gravity model is considered one of the most successful empirical frameworks in international economics. It has become a successful tool for the evaluation of trade policies or the calculation of trade potential associated with regional integration. However, a more detailed analysis of the underpinnings, the use of larger datasets and improvements in statistical and econometric software have highlighted new problems in estimating the gravity equation.

The key aim of this chapter is to evaluate corruption and trade in oil exporting countries and to investigate whether corruption hampers foreign trade or promotes cross-border commerce. In the course of the work, a panel model of gravitational data was considered, in which the criteria for sampling were two distinct geographical regions. Our findings demonstrate the adverse effect on foreign commerce from different sources of unethical behavior. More typical findings, indicating the need for global convergence, indicate a positive effect of transparency on the amount of exchange.

# IV. CONCLUSION

The aims of this research were: Collecting data for estimations and calculations; Modeling econometrics equation and hypotheses; Applying the gravity model to better understand the importance of the main determinants of international trade between 10 observed countries and its destruction because of corruption Analyzing the results

The three main parts of the master thesis outlined the stages of developing and researching: Literature from various authors who described the results of their work on the impact of corruption on trade was analyzed. It was summarized that corruption exists in various spheres of activity, and defined as the use of power to obtain greater benefits. The impact of corruption on trade is assessed as its negative impact on the development of international trade. For the second part of the study, data from the World Bank, OECD, Transparency International, CPI, and tradingeconomics.com were collected. To achieve the goal of the master's thesis and to assess the impact of corruption on trade was used the gravitational model was used, which is the best model for predicting bilateral trade flows.

In the third part of the master's thesis, was collected data and was assessed the impact of corruption on international trade in oil exporting countries. Getting results were summarized and evaluated.

And what was done as a result in this research: was collected the theoretical background and literature review concerning the impact of corruption on trade in oil exporting countries. Data from 10 countries were collected to assess the impact of corruption on trade in oil exporting countries. The main criteria for the selected countries were the level of corruption and the volume of oil exports. The data collection period for the study was from 2000 to 2018. Calculations were made between Kazakhstan and 9 other countries (Brazil, China, Iraq, Kuwait, Libya, Mexico, Russia, United Arab Emirates). The main variables that were used to assess the impact of corruption on trade $CORRUP_{ij}$ is the corruption index between country i and country j, $Difcorrup_{ij}$ is a measure of the country-pair disparity in the degree of corruption, $X_{ij}$-bilateral trade, REER - the real effective exchange rate. To evaluate the assumptions, 3 hypotheses were constructed, which were verified by the gravitational model using ordinary least squares and Poisson pseudo-Maximum likelihood methods. Hypothesis 1 - the high level of corruption in oil-exporting countries, which can affect economic growth and bilateral trade. Hypothesis 2 - the high

level of corruption in oil exporting countries may reduce the effectiveness of international trade. Hypothesis 3 - the positive impact of the real effective exchange rate on the development of international trade in the oil sector. Subsequently, after estimating three hypotheses, our model showed that 1 2 hypotheses are null hypotheses. And the expected positive impact of the real effective exchange rate on the development of international trade in the oil sector in hypothesis 3 was negative. Were applied a gravity model for international trade and were used the OLS (Ordinary Least Squares) and PPML (Poisson Pseudo-Maximum Likelihood) estimators and got a deeper understanding of the impact of corruption on trade in oil exporting countries.

As a result, the main objectives were reached and the results explain the effects of corruption on trade. Looking at the results and analysis made over the period from 2000 to 2018 on the impact of oil exports in 10 countries, it was observed that there is a negative relation between the corruption index and real GDP (Gross Domestic Product). From the end, there is a positive meaning of oil exports. It implies they have empirically led to export development while corruption has adversely impacted foreign trade. The decline in oil exports would also impact bilateral trade and economic development to a degree as it is the engine development of the oil-exporting countries' economies. The higher the corruption rate the lower the development of the oil sector 's bilateral exchange, as well as the foreign expenditure ratio. Considering that the oil sector has become the generator growth of the economy, monitoring the activities is expedient for the government to ensure accurate and better results.

Based on this research, it can be concluded that the effect of corruption on trade in oil exporting countries is significant. Estimations of Ordinary Least Squares and Poisson Pseudo-Maximum Likelihood estimators show that corruption has a negative effect on bilateral trade, income per capita differential has a positive and significant effect on Kazakhstan's export to nine destination countries. Distance ($DIST_{ij}$) and common border ($CONT_{ij}$) between country pairs have no significant coefficients and it means that these variables are not effect on the trade flows. Common language ($COMLANG_{ij}$) has a positive value but it is not important. Countries can create trade flows while they have different languages.

From my point of view, the study is quite interesting, and this work can be fundamental for further researches in similar studies that investigate the impact of corruption

on trade in oil exporting countries. But it is worth considering that corruption is a global problem and the research of this problem can cover many industries.

Based on the empirical research conducted in a theoretical and econometric manner, it can be recommended that the government could adopt some of the measures listed below to further improve international trade relations between countries and reduce the level of corruption:

1. The government needs to work out more strictly control over the correctness and legality of companies ' actions.
2. Improving the control of oil export operations and taking strict measures to detect violations in the workplace can reduce the level of corruption.
3. The ability to change the system in the field of oil production and establish processes for concluding contracts.
4. To eradicate corruption, I believe that it is necessary to change the mentality of people and their attitude to state bodies.
5. The government needs to set up the work of structures and bodies to quickly and effectively address the requests of companies. It is necessary to restore trust between state structures and companies not only producing and exporting oil, but also the trust of other companies and citizens in general.
6. Trade-oriented countries need to develop domestic macroeconomic conditions, such as financial reforms to improve trade flows and to use these reforms as anti-corruption reforms.

Corruption also refers to self-serving purposes, theft, bribes that many go to for profit. With the well-established work of state structures, with the control of the work of companies that operate in the country, the fulfillment of all the requirements and conditions under the law, it is possible to reduce corruption and change the attitude and mentality of people. Fair and legal decisions of the Supreme court, which show and prove that corruption is punishable by law, will inform the entire society as a whole about an honest attitude to their own and others' work.

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# ANNEXES

## ANNEX 1: The glossary of terms

**Bilateral trade** - is the exchange of goods between two nations promoting trade and investment (Investopedia,2019).

**Corruption -** dishonest or illegal behavior, especially of people in authority (Oxford Learner's Dictionary,2019).

**Corruption perception index [CPI]** –is the index, which ranks 180 countries and territories by their perceived levels of public sector corruption according to experts and businesspeople, uses a scale of 0 to 100, where 0 is highly corrupt and 100 is very clean (Transparency International, 2018).

**Dummy variable** - is a numeric variable that represents categorical data, such as gender, race, political affiliation, etc. (Statistic dictionary, 2020).

**Heteroskedasticity -** In statistics, heteroskedasticity (or heteroscedasticity) happens when the standard errors of a variable, monitored over a specific amount of time, are non-constant (Investopedia, 2019).

**Independent variable**- is a variable (often denoted by *x*) whose variation does not depend on that of another (Oxford Dictionary, 2019).

**International Trade** - is the exchange of capital, goods, and services across international borders or territories[1] because there is a need or want of goods or services (Wikipedia,2019).

**Net present value [NPV]** - is the difference between the present value of cash inflows and the present value of cash outflows over a period of time (Investopedia, 2020).

**The gravity model-** is a model that, in its traditional form, predicts bilateral trade flows based on the economic sizes and distance between two units. Research shows that there is "overwhelming evidence that trade tends to fall with distance (Carrère, Céline; Mrázová, Monika; Neary, J. Peter, (2020) .Gravity without Apology: The Science of Elasticities, Distance, and Trade).

## ANNEX 2: Abbreviations

CCI – Control Corruption Index

EITI - Extractive Industries Transparency Initiative

GDP - Gross Domestic Product

NPV - Net present value

OECD - Organization for Economic Co-operation and Development.

OPEC - Organization of the Petroleum Exporting Countries

OLS – The Ordinary Least Squares

PEP - Politically Exposed Person

PPML - Poisson Pseudo-Maximum Likelihood estimators

SCI – Structural Corruption Index

StAR - The Stolen Asset Recovery Initiative

UNODC - United Nations Office on Drugs and Crime

WB – World Bank

**ANNEX 3: Diagnostic tests results**

| *White Heteroskedasticity Test:* | | | | |
|---|---|---|---|---|
| F-statistic | 3.159915 | Probability | | 0.000000 |
| Obs*R-squared | 110.2330 | Probability | | 0.000159 |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -12993.98 | 4964.126 | -2.617577 | 0.0101 |
| LOG($GDP_i$) | 351.7419 | 99.68701 | 3.528463 | 0.0006 |
| (LOG($GDP_i$))^2 | -1.307440 | 2.037026 | -0.641838 | 0.5223 |
| (LOG($GDP_i$))*(LOG($GDP_j$)) | 1.887743 | 1.870383 | 1.009281 | 0.3151 |
| (LOG($GDP_i$))*$REER_i$ | -0.029360 | 0.250984 | -0.116981 | 0.9071 |
| (LOG($GDP_i$))*$REER_j$ | 0.040034 | 0.047958 | 0.834784 | 0.4057 |
| (LOG($GDP_i$))*(LOG($DIST_{ij}$)) | -41.02911 | 12.02050 | -3.413263 | 0.0009 |
| (LOG($GDP_i$))*$DIFF_{ij}$ | 0.000616 | 0.000288 | 2.137613 | 0.0348 |
| (LOG($GDP_i$))*$DIFCORRUP_{ij}$ | 0.048857 | 0.183202 | 0.266686 | 0.7902 |
| (LOG($GDP_i$))*$CORRUP_{ij}$ | 0.303629 | 0.486324 | 0.624336 | 0.5337 |
| (LOG($GDP_i$))*$CONT_{ij}$ | 36.10730 | 14.01339 | 2.576629 | 0.0113 |
| (LOG($GDP_i$))*$COMLANG_{ij}$ | -37.84353 | 9.905154 | -3.820590 | 0.0002 |
| LOG($GDP_j$) | -289.1110 | 169.0751 | -1.709957 | 0.0901 |
| (LOG($GDP_j$))^2 | -2.299968 | 0.932148 | -2.467386 | 0.0152 |
| (LOG($GDP_j$))*$REER_i$ | 0.021144 | 0.042080 | 0.502484 | 0.6163 |
| (LOG($GDP_j$))*$REER_j$ | 0.064890 | 0.057996 | 1.118866 | 0.2657 |
| (LOG($GDP_j$))*(LOG($DIST_{ij}$)) | 32.55927 | 19.99419 | 1.628436 | 0.1063 |
| (LOG($GDP_j$))*$DIFF_{ij}$ | -0.000331 | 0.000183 | -1.806146 | 0.0737 |
| (LOG($GDP_j$))*$DIFCORRUP_{ij}$ | 0.012501 | 0.089272 | 0.140036 | 0.8889 |
| (LOG($GDP_j$))*$CORRUP_{ij}$ | 0.106922 | 0.349061 | 0.306312 | 0.7600 |
| (LOG($GDP_j$))*$CONT_{ij}$ | -22.51834 | 19.00303 | -1.184987 | 0.2386 |
| (LOG(GDPJ))*$COMLANG_{ij}$ | 33.31352 | 17.93442 | 1.857519 | 0.0660 |
| $REER_i$ | 2.088297 | 2.455388 | 0.850496 | 0.3969 |
| $REER_i$^2 | 4.89E-05 | 0.004537 | 0.010772 | 0.9914 |
| $REER_i$*$REER_j$ | -0.001064 | 0.002088 | -0.509558 | 0.6114 |
| $REER_i$*(LOG($DIST_{ij}$)) | -0.110948 | 0.305663 | -0.362975 | 0.7173 |

| | | | | |
|---|---|---|---|---|
| $REER_i$*$DIFF_{ij}$ | -6.04E-07 | 1.64E-05 | -0.036801 | 0.9707 |
| $REER_i$*$DIFCORRUP_{ij}$ | -0.010473 | 0.022541 | -0.464626 | 0.6431 |
| $REER_i$*$CORRUP_{ij}$ | -0.025824 | 0.056741 | -0.455122 | 0.6499 |
| $REER_i$*$CONT_{ij}$ | -0.110320 | 0.444036 | -0.248449 | 0.8043 |
| $REER_i$*$COMLANG_{ij}$ | -0.209700 | 0.209510 | -1.000905 | 0.3191 |
| $REER_j$ | 0.311223 | 3.034697 | 0.102555 | 0.9185 |
| $REER_j$^2 | -0.005301 | 0.002687 | -1.972869 | 0.0511 |
| $REER_j$*(LOG($DIST_{ij}$)) | 0.045018 | 0.343220 | 0.131163 | 0.8959 |
| $REER_j$*$DIFF_{ij}$ | -1.08E-05 | 1.17E-05 | -0.928984 | 0.3550 |
| $REER_j$*$DIFCORRUP_{ij}$ | -0.009450 | 0.005478 | -1.725060 | 0.0874 |
| $REER_j$*$CORRUP_{ij}$ | 0.013693 | 0.014293 | 0.958042 | 0.3402 |
| $REER_j$*$CONT_{ij}$ | -0.374487 | 0.488756 | -0.766205 | 0.4452 |
| $REER_j$*$COMLANG_{ij}$ | -0.549131 | 0.225422 | -2.436014 | 0.0165 |
| LOG($DIST_{ij}$) | 3167.289 | 1245.996 | 2.541973 | 0.0124 |
| (LOG($DIST_{ij}$))^2 | -188.4468 | 74.84819 | -2.517720 | 0.0133 |
| (LOG($DIST_{ij}$))*$DIFF_{ij}$ | 0.006575 | 0.001900 | 3.460982 | 0.0008 |
| (LOG($DIST_{ij}$))*$DIFCORRUP_{ij}$ | 0.600399 | 0.656607 | 0.914396 | 0.3625 |
| (LOG($DIST_{ij}$))*$CORRUP_{ij}$ | -0.341805 | 1.320823 | -0.258781 | 0.7963 |
| (LOG($DIST_{ij}$))*$CONT_{ij}$ | 337.4072 | 152.0169 | 2.219537 | 0.0285 |
| (LOG($DIST_{ij}$))*$COMLANG_{ij}$ | -33.86813 | 67.61160 | -0.500922 | 0.6174 |
| $DIFF_{ij}$ | -0.062017 | 0.016415 | -3.778006 | 0.0003 |
| $DIFF_{ij}$^2 | -1.02E-09 | 1.49E-08 | -0.068367 | 0.9456 |
| $DIFF_{ij}$*$DIFCORRUP_{ij}$ | 2.24E-05 | 3.26E-05 | 0.685619 | 0.4944 |
| $DIFF_{ij}$*$CORRUP_{ij}$ | 1.67E-05 | 4.92E-05 | 0.338425 | 0.7357 |
| $DIFF_{ij}$*$CONT_{ij}$ | -0.002309 | 0.001960 | -1.178011 | 0.2414 |
| $DIFF_{ij}$*$COMLANG_{ij}$ | 0.007975 | 0.001936 | 4.120190 | 0.0001 |
| $DIFCORRUP_{ij}$ | -2.153193 | 6.271165 | -0.343348 | 0.7320 |
| $DIFCORRUP_{ij}$^2 | -0.028635 | 0.021250 | -1.347533 | 0.1806 |
| $DIFCORRUP_{ij}$*$CORRUP_{ij}$ | -0.048135 | 0.071133 | -0.676691 | 0.5000 |
| DIFCORRUPIJ*$CONT_{ij}$ | -0.286858 | 0.854903 | -0.335544 | 0.7379 |
| $DIFCORRUP_{ij}$*$COMLANG_{ij}$ | 0.213610 | 0.561985 | 0.380098 | 0.7046 |

| | | | | |
|---|---|---|---|---|
| $CORRUP_{ij}$ | 4.893555 | 11.86428 | 0.412461 | 0.6808 |
| $CORRUP_{ij}$^2 | -0.042991 | 0.085400 | -0.503409 | 0.6157 |
| $CORRUP_{ij}$*$CONT_{ij}$ | -0.378780 | 2.105501 | -0.179900 | 0.8576 |
| CORRUPIJ*COMLANGIJ | -0.796181 | 1.186129 | -0.671243 | 0.5035 |
| $CONT_{ij}$ | -3354.417 | 1644.463 | -2.039825 | 0.0438 |
| $CONT_{ij}$*$COMLANG_{ij}$ | 468.6770 | 643.1550 | 0.728715 | 0.4678 |
| R-squared | 0.644637 | Mean dependent var | | 5.901598 |
| Adjusted R-squared | 0.440633 | S.D. dependent var | | 8.545688 |
| S.E. of regression | 6.391395 | Akaike info criterion | | 6.825092 |
| Sum squared resid | 4411.792 | Schwarz criterion | | 7.982547 |
| Log likelihood | -520.5453 | F-statistic | | 3.159915 |
| Durbin-Watson stat | 2.000020 | Prob(F-statistic) | | 0.000000 |

## ANNEX 4: The collected data for estimations in Eviews program

| Year | $X_{ij}$ | $GDP_i$ | $GDP_j$ | $DIST_{ij}$ | $CONT_{ij}$ | $COMLANG_{ij}$ | $CORRUP_{ij}$ | $DIFCORRUPT_{ij}$ | $DIFF_{ij}$ | $REER_i$ | $REER_j$ | Countries |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | 1710262,2 | 18,292 | 259,71 | 2272,57 | 0 | 1 | 25,0998 | 9 | -542,6 | 104 | 54,059 | KZ Russia |
| 2001 | 1733411,5 | 22,153 | 306,6 | 2272,57 | 0 | 1 | 24,91987 | 4 | -609,43 | 103 | 63,526 | KZ Russia |
| 2002 | 1497738,2 | 24,637 | 345,47 | 2272,57 | 0 | 1 | 24,91987 | -4 | -719,51 | 103 | 66,466 | KZ Russia |
| 2003 | 1967740,4 | 30,834 | 430,35 | 2272,57 | 0 | 1 | 25,45584 | -3 | -907,01 | 95 | 68,806 | KZ Russia |
| 2004 | 2836285,59 | 43,152 | 591,02 | 2272,57 | 0 | 1 | 24,81935 | -6 | -1228,1 | 97 | 74,305 | KZ Russia |
| 2005 | 2926578,21 | 57,124 | 764,02 | 2272,57 | 0 | 1 | 24,97999 | 2 | -1552,2 | 100,4 | 81,135 | KZ Russia |
| 2006 | 3730036,51 | 81,004 | 989,93 | 2272,57 | 0 | 1 | 25,4951 | 1 | -1628,6 | 108 | 88,934 | KZ Russia |
| 2007 | 4658919,35 | 104,85 | 1,3 | 2272,57 | 0 | 1 | 21,97726 | -2 | -2329,8 | 106 | 93,498 | KZ Russia |
| 2008 | 6227049,28 | 133,442 | 1,661 | 2272,57 | 0 | 1 | 21,49419 | 1 | -3121,7 | 109 | 99,072 | KZ Russia |
| 2009 | 3546966,53 | 115,309 | 1,223 | 2272,57 | 0 | 1 | 24,37212 | 5 | -1397,6 | 128 | 92,15 | KZ Russia |
| 2010 | 3006543,08 | 148,047 | 1,525 | 2272,57 | 0 | 1 | 24,67793 | 8 | -1604,5 | 110 | 100 | KZ Russia |
| 2011 | 7514522 | 192,627 | 2,052 | 2272,57 | 0 | 1 | 25,45584 | 3 | -2717,2 | 110 | 104,416 | KZ Russia |
| 2012 | 6747212,05 | 207,999 | 2,21 | 2272,57 | 0 | 1 | 28 | 0 | -3047,9 | 110,5 | 105,581 | KZ Russia |
| 2013 | 5875273,58 | 236,635 | 2,297 | 2272,57 | 0 | 1 | 26,98148 | -2 | -2116,5 | 115 | 107,003 | KZ Russia |
| 2014 | 6388500,43 | 221,416 | 2,06 | 2272,57 | 0 | 1 | 27,98214 | 2 | -1293,5 | 116 | 97,724 | KZ Russia |
| 2015 | 4547502,1 | 184,388 | 1,364 | 2272,57 | 0 | 1 | 28,49561 | -1 | 1197 | 132 | 79,568 | KZ Russia |
| 2016 | 3509161,68 | 137,278 | 1,283 | 2272,57 | 0 | 1 | 29 | 0 | -1030,5 | 85 | 79,253 | KZ Russia |
| 2017 | 4639035,21 | 166,806 | 1,579 | 2272,57 | 0 | 1 | 29,98333 | 2 | -1503 | 95 | 91,447 | KZ Russia |
| 2018 | 5279873,69 | 179,34 | 1,658 | 2272,57 | 0 | 1 | 29,46184 | 3 | -1476,3 | 90,3 | 84,54 | KZ Russia |
| 2000 | 672548,6 | 18,292 | 1,211 | 3656 | 0 | 1 | 30,4959 | -1 | 269,63 | 104 | 92,759 | KZ China |
| 2001 | 646650,7 | 22,153 | 1,339 | 3656 | 0 | 1 | 30,74085 | -8 | 437,82 | 103 | 96,765 | KZ China |
| 2002 | 1018679,9 | 24,637 | 1,471 | 3656 | 0 | 1 | 28,37252 | -12 | 509,52 | 103 | 94,555 | KZ China |
| 2003 | 1653081 | 30,834 | 1,66 | 3656 | 0 | 1 | 28,56571 | -10 | 779,48 | 95 | 88,38 | KZ China |
| 2004 | 1966911,13 | 43,152 | 1,955 | 3656 | 0 | 1 | 27,34959 | -12 | 1365,6 | 97 | 85,846 | KZ China |
| 2005 | 2422506,65 | 57,124 | 2,286 | 3656 | 0 | 1 | 28,84441 | -6 | 2017,9 | 100,4 | 84,919 | KZ China |
| 2006 | 3592514,16 | 81,004 | 2,752 | 3656 | 0 | 1 | 29,29164 | -7 | 3192,3 | 108 | 86,255 | KZ China |
| 2007 | 5635914,31 | 104,85 | 3,55 | 3656 | 0 | 1 | 27,11088 | -14 | 4077,4 | 106 | 89,33 | KZ China |
| 2008 | 7676608,96 | 133,442 | 4,594 | 3656 | 0 | 1 | 28,14249 | -14 | 5045,3 | 109 | 97,024 | KZ China |
| 2009 | 5888592,5 | 115,309 | 5,102 | 3656 | 0 | 1 | 31,17691 | -9 | 3333 | 128 | 101,111 | KZ China |
| 2010 | 10122070,04 | 148,047 | 6,087 | 3656 | 0 | 1 | 31,85906 | -6 | 4520 | 110 | 100 | KZ China |
| 2011 | 16291513,14 | 192,627 | 7,552 | 3656 | 0 | 1 | 31,17691 | -9 | 6015,9 | 110 | 102,724 | KZ China |
| 2012 | 16484409 | 207,999 | 8,532 | 3656 | 0 | 1 | 33,04542 | -11 | 6069,8 | 110,5 | 108,707 | KZ China |
| 2013 | 14373748,04 | 236,635 | 9,57 | 3656 | 0 | 1 | 32,24903 | -14 | 6840 | 115 | 114,638 | KZ China |
| 2014 | 9799418,42 | 221,416 | 10,439 | 3656 | 0 | 1 | 32,31099 | -7 | 5155,9 | 116 | 118,337 | KZ China |
| 2015 | 5480137,49 | 184,388 | 11,016 | 3656 | 0 | 1 | 32,18695 | -9 | 2477,4 | 132 | 129,948 | KZ China |
| 2016 | 4214925,9 | 137,278 | 11,138 | 3656 | 0 | 1 | 34,05877 | -11 | -363,95 | 85 | 123,622 | KZ China |
| 2017 | 5797975,62 | 166,806 | 12,143 | 3656 | 0 | 1 | 35,65109 | -10 | 488,54 | 95 | 120,06 | KZ China |
| 2018 | 6307476,19 | 179,34 | 13,608 | 3656 | 0 | 1 | 34,77068 | -8 | 41,754 | 90,3 | 121,674 | KZ China |
| 2000 | 6,342 | 18,292 | 707,91 | 12124 | 1 | 1 | 31,46427 | -3 | -5928,8 | 104 | 115,545 | KZ Mexico |
| 2001 | 55,42 | 22,153 | 756,71 | 12124 | 1 | 1 | 31,60696 | -10 | -6053,6 | 103 | 123,019 | KZ Mexico |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2002 | 69,21 | 24,637 | 772,11 | 12124 | 1 | 1 | 28,77499 | -13 | -5935,1 | 103 | 123,05 | KZ Mexico |
| 2003 | 44,5 | 30,834 | 729,34 | 12124 | 1 | 1 | 29,39388 | -12 | -5007,2 | 95 | 110,189 | KZ Mexico |
| 2004 | 97,21 | 43,152 | 782,24 | 12124 | 1 | 1 | 28,14249 | -14 | -4610,2 | 97 | 105,977 | KZ Mexico |
| 2005 | 931,75 | 57,124 | 877,48 | 12124 | 1 | 1 | 30,16621 | -9 | -4506,4 | 100,4 | 109,803 | KZ Mexico |
| 2006 | 2,24 | 81,004 | 975,39 | 12124 | 1 | 1 | 29,29164 | -7 | -3776,7 | 108 | 109,904 | KZ Mexico |
| 2007 | 30,42 | 104,85 | 1,053 | 12124 | 1 | 1 | 27,11088 | -14 | -2871,3 | 106 | 108,373 | KZ Mexico |
| 2008 | 23,31 | 133,442 | 1,11 | 12124 | 1 | 1 | 28,14249 | -14 | -1503 | 109 | 106,08 | KZ Mexico |
| 2009 | 236,1 | 115,309 | 900,05 | 12124 | 1 | 1 | 29,84962 | -6 | -837,75 | 128 | 92,78 | KZ Mexico |
| 2010 | 64,91 | 148,047 | 1,058 | 12124 | 1 | 1 | 29,98333 | -2 | -200,91 | 110 | 100 | KZ Mexico |
| 2011 | 1076,46 | 192,627 | 1,18 | 12124 | 1 | 1 | 28,4605 | -3 | 1430,6 | 110 | 99,799 | KZ Mexico |
| 2012 | 13,9 | 207,999 | 1,201 | 12124 | 1 | 1 | 30,8545 | -6 | 2145 | 110,5 | 96,629 | KZ Mexico |
| 2013 | 171,63 | 236,635 | 1,274 | 12124 | 1 | 1 | 29,73214 | -8 | -56835 | 115 | 102,272 | KZ Mexico |
| 2014 | 790,98 | 221,416 | 1,315 | 12124 | 1 | 1 | 31,85906 | -6 | 1884,9 | 116 | 101,247 | KZ Mexico |
| 2015 | 323,65 | 184,388 | 1,171 | 12124 | 1 | 1 | 31,30495 | -7 | 904,82 | 132 | 90,745 | KZ Mexico |
| 2016 | 702,19 | 137,278 | 1,078 | 12124 | 1 | 1 | 29,49576 | -1 | -1024,9 | 85 | 79,022 | KZ Mexico |
| 2017 | 1745,45 | 166,806 | 1,158 | 12124 | 1 | 1 | 29,98333 | 2 | -30,837 | 95 | 80,879 | KZ Mexico |
| 2018 | 3240,43 | 179,34 | 1,221 | 12124 | 1 | 1 | 29,46184 | 3 | 139,16 | 90,3 | 80,993 | KZ Mexico |
| 2000 | 573,5 | 18,292 | 117,68 | 12070 | 1 | 1 | 28,4605 | 3 | 1224,2 | 104 | 79,969 | KZ Venezuela |
| 2001 | 45,7 | 22,153 | 123,16 | 12070 | 1 | 1 | 27,49545 | -1 | 1486 | 103 | 85,054 | KZ Venezuela |
| 2002 | 178,5 | 24,637 | 95,57 | 12070 | 1 | 1 | 23,97916 | -2 | 1654,2 | 103 | 66,502 | KZ Venezuela |
| 2003 | 85,5 | 30,834 | 83,67 | 12070 | 1 | 1 | 24 | 0 | 2064,9 | 95 | 57,745 | KZ Venezuela |
| 2004 | 121,28 | 43,152 | 112,19 | 12070 | 1 | 1 | 22,49444 | -1 | 2870 | 97 | 55,764 | KZ Venezuela |
| 2005 | 59,48 | 57,124 | 143,33 | 12070 | 1 | 1 | 24,45404 | 3 | 3765,9 | 100,4 | 54,588 | KZ Venezuela |
| 2006 | 7,25 | 81,004 | 177,72 | 12070 | 1 | 1 | 24,45404 | 3 | 5285 | 108 | 57,811 | KZ Venezuela |
| 2007 | 8,95 | 104,85 | 221,95 | 12070 | 1 | 1 | 20,4939 | 1 | 6763,3 | 106 | 63,351 | KZ Venezuela |
| 2008 | 151,5 | 133,442 | 289,88 | 12070 | 1 | 1 | 20,44505 | 3 | 8503,1 | 109 | 75,972 | KZ Venezuela |
| 2009 | 33,31 | 115,309 | 237,45 | 12070 | 1 | 1 | 22,6495 | 8 | 7156,8 | 128 | 99,068 | KZ Venezuela |
| 2010 | 9,58 | 148,047 | 294,51 | 12070 | 1 | 1 | 24,08319 | 9 | 9060,2 | 110 | 100 | KZ Venezuela |
| 2011 | 291,42 | 192,627 | 334,27 | 12070 | 1 | 1 | 22,6495 | 8 | 11622 | 110 | 70,802 | KZ Venezuela |
| 2012 | 28,2 | 207,999 | 331,63 | 12070 | 1 | 1 | 23,06513 | 9 | 12375 | 110,5 | 87,987 | KZ Venezuela |
| 2013 | 13,62 | 236,635 | 234,4 | 12070 | 1 | 1 | 22,80351 | 6 | 13883 | 115 | 83,227 | KZ Venezuela |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2014 | 39,44 | 221,416 | 212,35 | 12070 | 1 | 1 | 23,47339 | 10 | 12800 | 116 | 128,956 | KZ Venezuela |
| 2015 | 2678,83 | 184,388 | 323,6 | 12070 | 1 | 1 | 21,81742 | 11 | 10500 | 132 | 100,2 | KZ Venezuela |
| 2016 | 90,91 | 137,278 | 279,25 | 12070 | 1 | 1 | 22,2036 | 12 | 7705,5 | 85 | 90,2 | KZ Venezuela |
| 2017 | 505,42 | 166,806 | 143,25 | 12070 | 1 | 1 | 23,62202 | 13 | 9242,7 | 95 | 80,3 | KZ Venezuela |
| 2018 | 0,45 | 179,34 | 98,437 | 12070 | 1 | 1 | 23,62202 | 13 | 9809,2 | 90,3 | 80,3 | KZ Venezuela |
| 2000 | 21,7 | 18,292 | 38,27 | 7810,3 | 1 | 1 | 25,0998 | 9 | -5913,8 | 104 | 0,512 | KZ Libya |
| 2001 | 21,7 | 22,153 | 34,11 | 7810,3 | 1 | 1 | 23,81176 | 6 | -4775,6 | 103 | 0,605 | KZ Libya |
| 2002 | 30,5 | 24,637 | 20,482 | 7810,3 | 1 | 1 | 21,97726 | 2 | -2045 | 103 | 1,27 | KZ Libya |
| 2003 | 45,6 | 30,834 | 26,266 | 7810,3 | 1 | 1 | 22,44994 | 3 | -2605 | 95 | 1,28 | KZ Libya |
| 2004 | 177,37 | 43,152 | 33,122 | 7810,3 | 1 | 1 | 23,45208 | -3 | -2926,3 | 97 | 1,3 | KZ Libya |
| 2005 | 174,3 | 57,124 | 47,334 | 7810,3 | 1 | 1 | 25,4951 | 1 | -4391,7 | 100,4 | 1,308 | KZ Libya |
| 2006 | 1216,56 | 81,004 | 54,962 | 7810,3 | 1 | 1 | 26,49528 | -1 | -4044,8 | 108 | 1,314 | KZ Libya |
| 2007 | 13176,26 | 104,85 | 67,516 | 7810,3 | 1 | 1 | 22,91288 | -4 | -4528,8 | 106 | 1,263 | KZ Libya |
| 2008 | 2752,51 | 133,442 | 87,14 | 7810,3 | 1 | 1 | 23,91652 | -4 | -5869 | 109 | 1,224 | KZ Libya |
| 2009 | 4191,58 | 115,309 | 63,028 | 7810,3 | 1 | 1 | 25,98076 | 2 | -3110 | 128 | 1,254 | KZ Libya |
| 2010 | 11641,36 | 148,047 | 74,773 | 7810,3 | 1 | 1 | 25,25866 | 7 | -2994,3 | 110 | 1,267 | KZ Libya |
| 2011 | 15,52 | 192,627 | 34,699 | 7810,3 | 1 | 1 | 23,81176 | 6 | 6079,8 | 110 | 1,224 | KZ Libya |
| 2012 | 3263,4 | 207,999 | 81,874 | 7810,3 | 1 | 1 | 24,24871 | 7 | -638,58 | 110,5 | 1,262 | KZ Libya |
| 2013 | 5123,46 | 236,635 | 65,503 | 7810,3 | 1 | 1 | 19,74842 | 11 | 3526,8 | 115 | 1,272 | KZ Libya |
| 2014 | 1679,38 | 221,416 | 41,143 | 7810,3 | 1 | 1 | 22,84732 | 11 | 6340,4 | 116 | 1,272 | KZ Libya |
| 2015 | 0,36 | 184,388 | 27,842 | 7810,3 | 1 | 1 | 21,16601 | 12 | 6172,9 | 132 | 1,381 | KZ Libya |
| 2016 | 0,24 | 137,278 | 26,197 | 7810,3 | 1 | 1 | 20,14944 | 15 | 3679,6 | 85 | 1,389 | KZ Libya |
| 2017 | 2,7 | 166,806 | 37,881 | 7810,3 | 1 | 1 | 22,95648 | 14 | 3491,2 | 95 | 1,385 | KZ Libya |
| 2018 | 23,11 | 179,34 | 48,364 | 7810,3 | 1 | 1 | 22,95648 | 14 | 2570,9 | 90,3 | 1,365 | KZ Libya |
| 2000 | 11007,6 | 18,292 | 104,34 | 5954,4 | 1 | 1 | 39,49684 | -22 | -32062 | 104 | 100,5 | KZ United Arab Emirates |
| 2001 | 330339,8 | 22,153 | 103,31 | 5954,4 | 1 | 1 | 37,46999 | -25 | -29790 | 103 | 107 | KZ United Arab Emirates |
| 2002 | 472276,7 | 24,637 | 109,82 | 5954,4 | 1 | 1 | 34,58323 | -29 | -29909 | 103 | 114 | KZ United Arab Emirates |
| 2003 | 215057,2 | 30,834 | 124,35 | 5954,4 | 1 | 1 | 35,32704 | -28 | -31431 | 95 | 108 | KZ United Arab Emirates |
| 2004 | 31783,66 | 43,152 | 147,82 | 5954,4 | 1 | 1 | 36,63332 | -39 | -33459 | 97 | 97 | KZ United Arab Emirates |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | 20176,67 | 57,124 | 180,62 | 5954,4 | 1 | 1 | 40,14972 | -36 | -35594 | 100,4 | 96 | KZ United Arab Emirates |
| 2006 | 80004,99 | 81,004 | 222,12 | 5954,4 | 1 | 1 | 40,14972 | -36 | -36616 | 108 | 105 | KZ United Arab Emirates |
| 2007 | 56128,24 | 104,85 | 257,92 | 5954,4 | 1 | 1 | 34,59769 | -36 | -35038 | 106 | 107 | KZ United Arab Emirates |
| 2008 | 90491,1 | 133,442 | 315,48 | 5954,4 | 1 | 1 | 36,02777 | -37 | -35985 | 109 | 105 | KZ United Arab Emirates |
| 2009 | 20173,27 | 115,309 | 253,55 | 5954,4 | 1 | 1 | 41,89272 | -38 | -24859 | 128 | 124 | KZ United Arab Emirates |
| 2010 | 13801,73 | 148,047 | 289,79 | 5954,4 | 1 | 1 | 42,74342 | -34 | -24823 | 110 | 115 | KZ United Arab Emirates |
| 2011 | 34019,63 | 192,627 | 350,67 | 5954,4 | 1 | 1 | 42,84857 | -41 | -27561 | 110 | 112 | KZ United Arab Emirates |
| 2012 | 122302,6 | 207,999 | 374,59 | 5954,4 | 1 | 1 | 43,63485 | -40 | -28590 | 110,5 | 110 | KZ United Arab Emirates |
| 2013 | 32537,18 | 236,635 | 390,11 | 5954,4 | 1 | 1 | 42,35564 | -43 | -28522 | 115 | 109 | KZ United Arab Emirates |
| 2014 | 83775,33 | 221,416 | 403,14 | 5954,4 | 1 | 1 | 45,05552 | -41 | -30945 | 116 | 110 | KZ United Arab Emirates |
| 2015 | 42474,75 | 184,388 | 358,14 | 5954,4 | 1 | 1 | 44,27189 | -42 | -28153 | 132 | 122 | KZ United Arab Emirates |
| 2016 | 305191,28 | 137,278 | 357,05 | 5954,4 | 1 | 1 | 43,74929 | -37 | -30427 | 85 | 129 | KZ United Arab Emirates |
| 2017 | 558763,4 | 166,806 | 377,7 | 5954,4 | 1 | 1 | 46,91482 | -40 | -30564 | 95 | 133 | KZ United Arab Emirates |
| 2018 | 412664,25 | 179,34 | 414,18 | 5954,4 | 1 | 1 | 46,58326 | -39 | -33192 | 90,3 | 125 | KZ United Arab Emirates |
| 2000 | 26,4 | 18,292 | 37,713 | 4795,5 | 1 | 1 | 35,91657 | -13 | -17211 | 104 | 98 | KZ Kuwait |
| 2001 | 171,8 | 22,153 | 34,888 | 4795,5 | 1 | 1 | 34,07345 | -16 | -15096 | 103 | 99 | KZ Kuwait |
| 2002 | 50,6 | 24,637 | 38,138 | 4795,5 | 1 | 1 | 31,81195 | -21 | -16188 | 103 | 104 | KZ Kuwait |
| 2003 | 96,35 | 30,834 | 47,877 | 4795,5 | 1 | 1 | 35,66511 | -29 | -20080 | 95 | 103 | KZ Kuwait |
| 2004 | 249,4 | 43,152 | 59,439 | 4795,5 | 1 | 1 | 31,81195 | -24 | -24137 | 97 | 95,5 | KZ Kuwait |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | 5,79 | 57,124 | 80,799 | 4795,5 | 1 | 1 | 34,95712 | -21 | -31820 | 100,4 | 91 | KZ Kuwait |
| 2006 | 97,24 | 81,004 | 101,55 | 4795,5 | 1 | 1 | 35,32704 | -22 | -37490 | 108 | 92,3 | KZ Kuwait |
| 2007 | 60,17 | 104,85 | 114,64 | 4795,5 | 1 | 1 | 30,04996 | -22 | -39011 | 106 | 93,8 | KZ Kuwait |
| 2008 | 4,26 | 133,442 | 147,4 | 4795,5 | 1 | 1 | 30,75711 | -21 | -46981 | 109 | 93 | KZ Kuwait |
| 2009 | 60,25 | 115,309 | 105,96 | 4795,5 | 1 | 1 | 33,27161 | -14 | -30396 | 128 | 101 | KZ Kuwait |
| 2010 | 33,18 | 148,047 | 115,42 | 4795,5 | 1 | 1 | 36,12478 | -16 | -29507 | 110 | 100 | KZ Kuwait |
| 2011 | 222,4 | 192,627 | 154,03 | 4795,5 | 1 | 1 | 35,24202 | -19 | -36985 | 110 | 100 | KZ Kuwait |
| 2012 | 544,2 | 207,999 | 174,07 | 4795,5 | 1 | 1 | 35,09986 | -16 | -39592 | 110,5 | 102 | KZ Kuwait |
| 2013 | 392,42 | 236,635 | 174,16 | 4795,5 | 1 | 1 | 33,43651 | -17 | -35498 | 115 | 104 | KZ Kuwait |
| 2014 | 246,09 | 221,416 | 162,63 | 4795,5 | 1 | 1 | 35,72114 | -15 | -31255 | 116 | 104,5 | KZ Kuwait |
| 2015 | 260,89 | 184,388 | 114,57 | 4795,5 | 1 | 1 | 37,04052 | -21 | -19359 | 132 | 112 | KZ Kuwait |
| 2016 | 122,08 | 137,278 | 109,42 | 4795,5 | 1 | 1 | 34,48188 | -12 | -19938 | 85 | 113 | KZ Kuwait |
| 2017 | 1414,58 | 166,806 | 120,71 | 4795,5 | 1 | 1 | 34,77068 | -8 | -20512 | 95 | 116 | KZ Kuwait |
| 2018 | 271,04 | 179,34 | 140,65 | 4795,5 | 1 | 1 | 35,65109 | -10 | -24182 | 90,3 | 117 | KZ Kuwait |
| 2000 | 143,9 | 18,292 | 25,9 | 4592,7 | 1 | 1 | 20,4939 | 16 | -3094,7 | 104 | 80,5 | KZ Iraq |
| 2001 | 180,5 | 22,153 | 18,9 | 4592,7 | 1 | 1 | 19,44222 | 13 | -2802,7 | 103 | 94 | KZ Iraq |
| 2002 | 6260,8 | 24,637 | 19 | 4592,7 | 1 | 1 | 18,57418 | 8 | -2223,3 | 103 | 83,2 | KZ Iraq |
| 2003 | 331,2 | 30,834 | 18,9 | 4592,7 | 1 | 1 | 22,97825 | 2 | -456,28 | 95 | 80,6 | KZ Iraq |
| 2004 | 2,93 | 43,152 | 36,628 | 4592,7 | 1 | 1 | 21,49419 | 1 | -918,21 | 97 | 80,512 | KZ Iraq |
| 2005 | 3,12 | 57,124 | 49,955 | 4592,7 | 1 | 1 | 23,91652 | 4 | -98,721 | 100,4 | 79,486 | KZ Iraq |
| 2006 | 4,25 | 81,004 | 65,14 | 4592,7 | 1 | 1 | 22,22611 | 7 | 1110,2 | 108 | 79,585 | KZ Iraq |
| 2007 | 5,55 | 104,85 | 88,84 | 4592,7 | 1 | 1 | 17,74824 | 6 | 2602,7 | 106 | 93,297 | KZ Iraq |
| 2008 | 8069,13 | 133,442 | 131,61 | 4592,7 | 1 | 1 | 16,91153 | 9 | 4077,3 | 109 | 98,079 | KZ Iraq |
| 2009 | 4674,39 | 115,309 | 88,84 | 4592,7 | 1 | 1 | 20,12461 | 12 | 2672 | 128 | 100 | KZ Iraq |
| 2010 | 18891,25 | 148,047 | 138,52 | 4592,7 | 1 | 1 | 20,85665 | 14 | 4413,2 | 110 | 100 | KZ Iraq |
| 2011 | 1000,58 | 192,627 | 185,75 | 4592,7 | 1 | 1 | 22,04541 | 9 | 6785,6 | 110 | 100 | KZ Iraq |
| 2012 | 3535,7 | 207,999 | 218 | 4592,7 | 1 | 1 | 22,44994 | 10 | 7064,3 | 110,5 | 100,329 | KZ Iraq |
| 2013 | 34115,3 | 236,635 | 234,64 | 4592,7 | 1 | 1 | 20,39608 | 10 | 8382,6 | 115 | 100,343 | KZ Iraq |
| 2014 | 6700,07 | 221,416 | 234,65 | 4592,7 | 1 | 1 | 21,54066 | 13 | 7463 | 116 | 100,343 | KZ Iraq |
| 2015 | 9736,51 | 184,388 | 177,5 | 4592,7 | 1 | 1 | 21,16601 | 12 | 5212,7 | 132 | 100,23 | KZ Iraq |
| 2016 | 5088,44 | 137,278 | 174,88 | 4592,7 | 1 | 1 | 22,2036 | 12 | 1868,3 | 85 | 98,985 | KZ Iraq |
| 2017 | 2867,85 | 166,806 | 195,47 | 4592,7 | 1 | 1 | 23,62202 | 13 | 3643 | 95 | 100 | KZ Iraq |
| 2018 | 3251,44 | 179,34 | 224,23 | 4592,7 | 1 | 1 | 23,62202 | 13 | 4301,8 | 90,3 | 100 | KZ Iraq |
| 2000 | 3,9 | 18,292 | 33,588 | 13398 | 1 | 1 | 34,20526 | -9 | -4263,6 | 104 | 76,575 | KZ Brazil |
| 2001 | 3,4 | 22,153 | 33,396 | 13398 | 1 | 1 | 32,86335 | -13 | -3900,3 | 103 | 63,941 | KZ Brazil |
| 2002 | 3,9 | 24,637 | 34,674 | 13398 | 1 | 1 | 30,3315 | -17 | -3869 | 103 | 60,938 | KZ Brazil |
| 2003 | 13,6 | 30,834 | 38,902 | 13398 | 1 | 1 | 30,59412 | -15 | -4055,6 | 95 | 57,596 | KZ Brazil |
| 2004 | 1421,65 | 43,152 | 43,816 | 13398 | 1 | 1 | 29,29164 | -17 | -3937,6 | 97 | 60,451 | KZ Brazil |
| 2005 | 3933,19 | 57,124 | 47,457 | 13398 | 1 | 1 | 31,01612 | -11 | -3515,7 | 100,4 | 73,466 | KZ Brazil |
| 2006 | 13951,53 | 81,004 | 51,448 | 13398 | 1 | 1 | 29,29164 | -7 | -2511,2 | 108 | 81,731 | KZ Brazil |
| 2007 | 285,41 | 104,85 | 57,968 | 13398 | 1 | 1 | 27,11088 | -14 | -1912,8 | 106 | 87,435 | KZ Brazil |
| 2008 | 26571,94 | 133,442 | 63,612 | 13398 | 1 | 1 | 27,74887 | -13 | -899,38 | 109 | 90,378 | KZ Brazil |
| 2009 | 1902,67 | 115,309 | 60,334 | 13398 | 1 | 1 | 31,60696 | -10 | -1654,8 | 128 | 89,164 | KZ Brazil |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | 18070,7 | 148,047 | 66,051 | 13398 | 1 | 1 | 32,75668 | -8 | -470,42 | 110 | 100 | KZ Brazil |
| 2011 | 48694,21 | 192,627 | 73,393 | 13398 | 1 | 1 | 32,03123 | -11 | 1155,3 | 110 | 103,186 | KZ Brazil |
| 2012 | 70895,2 | 207,999 | 75,085 | 13398 | 1 | 1 | 34,6987 | -15 | 1791,9 | 110,5 | 92,011 | KZ Brazil |
| 2013 | 35514,22 | 236,635 | 77,237 | 13398 | 1 | 1 | 33,04542 | -16 | 3119,8 | 115 | 86,433 | KZ Brazil |
| 2014 | 61610,56 | 221,416 | 79,333 | 13398 | 1 | 1 | 35,31289 | -14 | 1873,2 | 116 | 84,599 | KZ Brazil |
| 2015 | 58900,36 | 184,388 | 75,05 | 13398 | 1 | 1 | 32,61901 | -10 | 286,72 | 132 | 69,618 | KZ Brazil |
| 2016 | 25845,67 | 137,278 | 76,165 | 13398 | 1 | 1 | 34,05877 | -11 | -2541,5 | 85 | 73,032 | KZ Brazil |
| 2017 | 23650,12 | 166,806 | 80,951 | 13398 | 1 | 1 | 33,86739 | -6 | -1530,1 | 95 | 79,257 | KZ Brazil |
| 2018 | 50921,31 | 179,34 | 85,911 | 13398 | 1 | 1 | 32,93934 | -4 | -1500 | 90,3 | 70,978 | KZ Brazil |

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